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ADDRESSES AND ORIGINAL ARTICLES

CLINICAL SENSE AND CLINICAL SCIENCE *

By John A. Ryle, M.D. Lond., F.R.C.P.

REGIUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF CAMBRIDGE; CONSULTING PHYSICIAN TO GUY'S HOSPITAL, LONDON

The inter-relationships between science, teaching and practice, must have a perennial interest for us all. How better to equip our sons and our students for their callings, whether professional or academic, than we ourselves were equipped must always be a matter for deep concern. Seeking to condense within a few words what is most desirable in the mental equipment of the doctor it occurred to me that "clinical sense" was sufficiently descriptive of what we most covet in ourselves and have most admired in our teachers or colleagues. Let us pause, however, to consider just what we mean by "clinical sense."

MEANING OF CLINICAL SENSE

Among my files of medical miscellanies I came recently upon a letter which I sent to *The Lancet* in 1934. It was prompted by some remarks of a fellow Guy's man, my friend and revered senior at Cambridge—Sir Frederick Gowland Hopkins—who, when discussing endowments for medical research during a presidential address to the Royal Society in that year, had occasion (without, perhaps, fully endorsing it) to quote the following sentence from an article in the *Times*:—

"The older physicians, with minds undisturbed by a crowd of scientific facts, developed a clinical sense—*sui generis*—as subtle as the sense of taste or the sense of smell, and it was on this sense that the great school of English medicine was founded."

While accepting the existence of such a sense, my comment here was to the effect that I could not regard it as a separate faculty, or flair, or intuition vouchsafed to medical men. We could scarcely pretend that such a faculty existed over and above or independently of the primary senses which physicians, physiologists, psychologists, and the ordinary man have recognised and studied in themselves and others, and beyond which no additional sense has been described. Nor could it be agreed that the great school of English medicine was founded on anything so elusive and immeasurable. While readily admitting that the minds of the older physicians were less disturbed "by a crowd of scientific facts" than the minds of the younger physicians of today, I deemed it furthermore an injustice to the training and the intellect of the clinician to suppose that he relied much or often on intuitive judgments.

Several colleagues disputed with me in a friendly way, putting in a plea for the separate existence of a clinical sense. Pondering their arguments, I concluded that we had never been at pains to discover what we meant by this familiar term. We have all, indeed, admired in our own friends or our chiefs the ability to arrive, without betraying the whole process, at wise and accurate decisions, but this ability is surely shared by all of us in some degree—or else we are no physicians. Swift and wise decisions have a clear relationship to experience, especially to length of experience. Their frequency and accuracy may proclaim degrees and standards of mental efficiency and types of personal endowment, but we cannot surely deny the contribution of clinical discipline.

The term clinical sense has not, however, attracted laudatory comment alone. To the pure scientist and to the hypercritical it has sometimes appeared as no better than a kind of guess-work combined, perhaps, with that necessary touch of sympathetic understanding which characterises the doctor and distinguishes him in some measure from men in other walks of life. Surely we should not be content to applaud or belittle a faculty whose existence we do not deny. Our very training should make us wish to analyse it.

Those who have observed the manifestations of clinical sense in others or have been at pains to review their own achievements and judgments due to its possession in however humble a degree will, I believe, agree that the attribute is not something innate or intuitive but a complex faculty built upon prolonged training and exercise of the known special senses together with a sound knowledge of pathological possibilities. Observational ability, the observational habit, observational accuracy, and a retentive memory for observed phenomena, together with an aptitude for the sifting and correlation of experience, are the main ingredients of clinical sense. Perspicacity and sympathy in psychological observation are the counterparts of the visual, tactile, and auditory faculties in physical observation but depend primarily on the same special senses.

The fact that observational ability of this kind and the wit to interpret phenomena may, on occasion, lead to surprisingly prompt and exact judgments is alone responsible for the view that these judgments are an expression of some separate and peculiar insight. A good visual memory and brisk association tracts may be a rare combination, but they do not entail new method.

Let us freely admit that some physicians with a high endowment of clinical sense are not wholly aware of the stages or processes of their judgments, or that they have lacked the time or desire to investigate them. The fact remains that these judgments are the result of sensory habit and discipline. The Oxford English Dictionary gives "the faculty of perception" as one of its first definitions of "sense." Is not the degree in which he possesses "the faculty of perception" just what determines the special ability of the doctor?

BASIS OF CLINICAL SENSE

As I have often maintained, the good physician requires the same qualities as the good naturalist. Take a walk abroad in the spring with a keen ornithologist, and, if uninitiated, you will be amazed at the swiftness and confidence of his judgments. When you see with difficulty only a small brown bird, indistinguishable even with the aid of your book and binoculars from many another, he will acclaim this warbler or that and seldom err. You may suppose that it is his trained eye alone that achieves where you fail, but analysis would probably show that his diagnoses were based on a composite knowledge of previously proved or likely habitat, of time of arrival in the spring migration, of movements and mode of flight, on a recognition of a tiny stave of song, and on many recollections or visual images of other springs. The size and shape and colour of the bird have clearly influenced him, but possibly less than and only in concert with these other observations.

* The annual oration delivered to the Medical Society of London on May 8, 1939.

Do we say of our friend "What a wonderful ornithological sense he has"? No, we merely call him a good naturalist. And so with the clinician and the puzzling case; it is not the single physical sign so much as the circumstances of the illness, the age and habitus and environmental conditions of the patient, the syndrome echoing syndromes encountered before, or even a single peculiar symptom or sign recalling the features of a single other case. These and an estimate of "the whole patient" and of his reactions to his illness may tell more in diagnosis and contribute more to prognosis and treatment than the most careful routine examination, more sometimes, let us remember, than all the details of a modern "complete investigation" with its attendant expense and inconvenience to the patient. Such judgments cannot be called guess-work or attributed to a subtle insight, *sui generis*. They are the result of a discipline of the special senses, of an observational science differing only from the discipline and science of the laboratory worker in that the observations have not been set down in orderly protocols but lodged and stored in a busy mind, not tested and improved by measurement and staged experiment but at least amplified and assisted by experience. For the biologist's records and method the physician, however full his notebooks, must constantly, through pressure of circumstance, substitute his powers of memory and association.

It would not be difficult for any one of us to extract from student or consultative reminiscences notable examples of judgments attributable to a fine clinical sense or the faculty of perceiving. There are some particularly good stories of Sir William Gull's consultative triumphs, in which clinical sense and common sense prevailed where the wit or industry of others had been found wanting. One of the Guy's surgeons had a case of ununited fracture which was giving him concern and decided one day with his house-surgeon to waylay Gull and ask his advice on the case, scarcely expecting that he would have any useful contribution to make to so surgical a problem. Gull took a look at the man and said "Feed him on tomatoes"—nothing more. The instruction was obeyed and the fracture united. When asked later by the surgeon his reasons for this advice, he replied that the surgeon and his house-surgeon might know all about fractures but had failed to observe that the man had signs of scurvy.

Some years ago I was much worried by the case of a man home from the east with a history of amœbic dysentery. He had a large and tender liver, with upward elevation of its dullness, a continuous fever with sweats but no chills, and pain in the cæcal region. Emetine was quite ineffective. I asked Lord Horder to see him. He advised quinine, and all the symptoms and signs rapidly departed. The man, I knew, had also had malaria, but I had been unable to draw another inference and to dissociate the present clinical picture from his dysenteric past.

Clinical sense may manifest itself in diagnosis, prognosis, treatment, and often too in the withholding of treatment. In the matter of diagnosis the judgment is frequently, as we well know, referable to recollections of a kindred case, to a fresh association of ideas, or to some small but carefully elicited historical point rather than to the discovery of new objective signs.

In the matter of prognosis how frequently we must all of us have said or heard said, "I believe this fellow is going to do" or "I don't like the look of this man," with full justification later for what seemed at the time a vague opinion. Are we not too content with the fact of such achievements and too little anxious to discover their manner? How often do we pause to analyse opinions and so make judgments of them? If we did so systematically, we should discover that general demeanour, pulse quality or some change in it, a seemingly trivial alteration in colour or muscular tone, the state of the skin or the lustre of eye or hair, the odour of the bedside, or an improved knowledge of prognosis in the particular disease born of accumulating experience, were severally or collectively the basis of the favourable or unfavourable opinion—not intuition, not guess-work, but once more the faculty of perceiving and of correlating past with present knowledge.

In the field of treatment and in the task of prognosis, with which sound treatment is so intimately related, good clinical sense seems to me more rare today than is the case with diagnosis. The prevailing urge to action; the phase of over-reliance on surgery (whose triumphs in acute disease made us at first too impatient in the development of its wider potentialities); the vaccine craze; the proprietary endocrine allurements; the other blandishments of the advertising chemists—all of these have helped to lead us astray. I have on occasion been disappointed by the relatively poor therapeutic sense of colleagues whose ability I have otherwise held in the highest regard. We must all feel ashamed at times of the ready susceptibility of our profession to fads and crazes in treatment. Drugs doubtful and drugs inert, drugs unorthodox, and even drugs dangerous are prescribed in vast quantities and often to the neglect of sensible management and regimen or a simple psychiatry.

In therapeutics there are three chief dangers: (1) that of becoming stereotyped, (2) that of becoming timid or disillusioned, and (3) that of becoming crudely and inconsistently experimental. The man with a good therapeutic sense avoids these pitfalls and constantly adapts his physiotherapeutic and psychotherapeutic measures to the individual case, orders an iced melon or a shave or a change of room at the appropriate moment in a case of long illness; knows when to give morphine and when to withhold it; when to transfuse or not transfuse; when to tease, to be jocular or sympathetic, when to exhort or scold. At the same time he keeps warily abreast of new advances. I hold it no injustice to say that good therapeutic sense is rarer today that good diagnostic sense. The oncoming generations are obsessed with treatments rather than trained and versed in Treatment.

And this brings me to the more critical part of my address, for I must here confess—even though you mock a middle-aged wistfulness for the things that appeared better when we were young—that I am also disturbed by a sensible falling off in the quality and quantity, or at least in the diffusion of sound clinical sense, in the wider usage of the term, among those just referred to as "the oncoming generations." But the fault, let me hasten to add, is ours not theirs. We allow them to be embarrassed by "a crowd of scientific facts" and methods instead of teaching them their proper place and use. Our hospital discipline has changed inevitably with the growth of knowledge for the better in many respects but for the worse in some.

Picture for a moment two consultations on cases of abdominal pain. The first is presented in a few terse sentences by an overworked country doctor in the middle fifties. He tells you of the good lady's mode of life and temperament, of her worries and her exacting husband; describes her obstetric past and somewhat "allergic" ancestry; and concludes with a humble expression of his own belief that she has "a nervous tummy" and wants reassuring.

You soon confirm his view—even if you call it a "spastic colon"; between you you dispel the cancer-phobia and discourage the abuse of purgatives, and the patient goes home happy and with an improved prospect of health. The second is presented by a successful suburban colleague in the middle thirties. He starts the interview by saying "Mrs. X has a troublesome pain in her right iliac fossa; here are her X rays; would you like to look at them?" Then, as you wave them aside, he proceeds to describe how he took her to a surgical colleague last year, who agreed that it would be wiser to remove the appendix, and how wonderfully improved she was for the first few weeks, since when the pain had returned and become the bane of his and her existence. You sigh inwardly and start to unravel the whole mental and physical story yourself and then attempt the task of helping the patient and her doctor to the best of your ability without betraying your opinion that the operation was unwise and unnecessary and in its failure almost as potent a cause of persisting symptoms as your colleague's failure to know his patient.

TRAINING OF CLINICAL SENSE

What is wrong with medical education that it should, while multiplying diagnostic aids and instilling far more basic science than our fathers had, be failing in its cultivation of judgment and the faculty of perception from which judgment derives?

I suggest that we need not go far for our answer, and that the overcrowding of the curriculum and the multiplication of accessory diagnostic methods are not alone to blame. Children are often astute observers until they go to school. The natural method of acquiring information is then steadily replaced by the didactic method. Only a small proportion of boys and girls have the "natural history" bent so well established that it resists the confusion and interruption of a standard education. The remainder cease very largely to look about them and become content with book and black-board information. With the school certificate disposed of one would think that the first M.B. might invite a revival of the inquisitive observing attitude of mind, but here again the syllabus is too fixed and lessons are too often staged and set; the student looks in the frog or worm for what he has been told to see; his microscopic section has been illustrated by picture or diagram before he inspects it or is accompanied by a class description. In the remaining pre-clinical years it is not vastly different. He sees what he is told to see or expects to see and finds small encouragement to ponder common biological phenomena or to attempt a simple discovery on his own. Classes, lectures, tutorials, supervisions, and examinations leave small time or room for individual thought or action, discussion or experiment.

And then he arrives in the wards and has to acquire an entirely new orientation. At last he must begin to look and see for himself. Here eventually the better men are born again, but why should they have had to wait so long for their education in perceiving? For those of duller endowment it is sometimes too late or the acquisition of the observant faculty is at the best a slow and painful process.

Could we not from the beginning give our student a better chance and stimulus by prompting his interest in living animals and their movements and behaviour; by dissections without the book; by encouraging him to study human movements, expression, emotions, and all the daily events of human physiology on his own and with a proper infusion of intelligent assistance? Could we not, in anatomy and physiology, combine with more mammalian experiment a better use of the living healthy man and of those many functions of health which can be studied both by record and observation and in the laboratory? Clinical study is largely morbid physiology. Every symptom has a biological significance and a physiological interpretation, but what proportion of students can give a reasoned physiological interpretation of such symptoms as fainting, nausea, flatulence, anorexia, the varieties of dyspnœa, and many forms of visceral or corporeal pain? To what extent are clinical teachers applying physiological principles in bedside instruction? I know that clinical demonstrations in the earlier years are given sporadically in some schools, but could we not whet the clinical appetite and proclaim the continuity between physiology and pathology in all the schools by at least one carefully prepared clinical illustration of a problem in one or both of these subjects during each week of the pre-clinical period? I cannot see that in so doing we should be making the teaching of the basic sciences less scientific or less of a discipline. I am certain that we should enhance the interest of the preliminary years and bring livelier minds to the problems of the ward. At present a man may obtain first-class honours in the natural sciences and yet be a poor observer and interpreter at the bedside.

Let me give you an example of observational or inferential incapacity recently related to me by a friend. He was proceeding from one ward to another with his firm, when they were met by a ward-sister running upstairs with an amused look and a blood-stained handkerchief pressed to her face. He stopped and asked the firm "Was that an epistaxis or a hæmoptysis?" Several clerks plumped for hæmoptysis. I am not sure, however, that that judgment in a beginner was much inferior to the judgment which daily and in all civilised countries prescribes removal of the appendix for chronic abdominal pains due to every conceivable cause other than appendicitis. In most of such cases the fear of overlooking appendicitis, the lazy and bad philosophy that "it is better out, and operation can do no harm," an overweening belief in surgical infallibility, and the neglect of follow-up inquiry have between them eliminated clinical sense. The analysis of history and symptoms has been superficial and uncritical. Alas, too, these defects have trained the public to believe in and expect appendicectomy.

The inevitable subdivision of medicine into specialisms has broken the continuity of teaching. The value of the "general approach" to any and every case, whether to a tonsillar infection or a patch of eczema, an enlarged prostate, or an anxiety state, is in process of being forgotten. Investigation is tending to supersede and exclude instead of to supplement clinical appraisement. In his first three years the student observes and investigates too little; in his last three years, while learning to observe and investigate, he forgets his physiology and thinks too little.

If we could set ourselves seriously to the task, each in his own sphere, of restoring clinical discipline to its proper place, we should go far to counteract wrong tendencies and to assist our at present quite inadequate revisions of the medical curriculum.

MEANING AND USES OF CLINICAL SCIENCE

Let us now pass from the discussion of "clinical sense" to a consideration of "clinical science," another and a newer objective for the student mind.

Here again we would do well to start with definitions and with as clear an understanding as possible of what we mean by the term. We should not understand by clinical science the simple application to clinical practice of more scientific methods than have been employed in the past. The applications of physiology, pathology, immunology, chemistry, endoscopic technique, and radiology in medicine have conferred inestimable benefits, but we know too that they have added embarrassments and have tended to inhibit observational precision and to distract men's minds from the older disciplines. They have hampered, with the rapid spread of their influence, the orderly evolution of clinical sense where they might have enhanced it. They have made doctors more scientific in their methods and less so in their judgments. Concurrently, however, with these disturbing evolutionary changes, and in part answer to my criticisms, we welcome today the advent of a new and organised branch of biological inquiry, employing new and old methods and the capabilities of men trained in various ways and purposefully detached from practice and the economic need for practice for the sole purpose of a more searching study of disease processes in living man. This is the branch of inquiry which may appropriately be called clinical science and which, apart from its primary achievements, may come in time to influence our teaching methods. Of clinical science in this sense and in this country Sir Thomas Lewis has been the leading advocate, and I cannot do better than quote a part of his definition.

"This science," he says, "seeks by observation and otherwise, to define diseases as they occur in man; it attempts to understand these diseases and their many manifestations, and here especially makes use of the experimental method. It makes definite experiments upon disease and watches the effects of experiment conducted by injuries however they arise; it culls, or actually creates and uses physiological and pathological knowledge immediately related and applicable to the diseases studied."[1]

TRAINING FOR CLINICAL SCIENCE

Where and how can clinical science be best fostered, and how are its early steps being guided? How far can it divorce itself from the practical medicine of the teaching schools? How far can it develop in its disciples faculties and methods of inquiry different from those employed by physicians hitherto? In the process of development can it safely dispense with that discipline on which we rely for our instruction in clinical sense? How may it render assistance to teaching and practical medicine, for that is a function which might be lost sight of in the natural eagerness for abstract knowledge? These are questions we should surely attempt to answer.

Clinical science can be advanced anywhere where men of appropriate foresight and training have the time, the opportunity, and the material within their reach. Sir James Mackenzie advanced clinical science in the course of a busy general practice. Men primarily engaged in practice or teaching will, like the field naturalist, still make their contributions from time to time, sometimes in larger but usually in humbler ways. The teaching hospitals and the professorial units will make their contributions and play a useful part as training grounds for new recruits to the whole-time service of academic medicine; of necessity, however, they combine much undergraduate teaching and hospital routine with their research activities, and so their present atmosphere is not wholly favourable to scientific advancement. There remain, thanks to the Medical Research Council and some large benefactions, certain organisations pledged primarily to the service of clinical science in this country. These include the medical research units at University College Hospital, at Guy's Hospital, and at the National Hospital, Queen Square; the surgical unit at Edinburgh; the new department of medicine at Cambridge; and the medical, surgical, and obstetrical departments now coming into being under the Nuffield scheme at Oxford.

These departments of clinical science will make their contributions in due course partly through new methods and discovery; partly through their demonstration of what scientific medicine (employing the methods of physiology and chemistry and the extension of safe experiment to man) can do in the clinical field over and above the achievements of routine observational methods; but largely too, in my belief, by working in close geographical proximity with those who research in and teach the preclinical sciences and with those who practise institutional medicine. In my view it would be a grave mistake for the disciples of clinical science either to withdraw themselves too much into their own laboratories or to establish research institutions which would work independently of existing hospitals and university departments.

The frequent interchange of thought and discussion of problems as between the clinical scientist and the practising physician and his assistants and house-men is one of the most hopeful developments of these recent innovations. The interchange of thought and partition of problems with other biological scientists is surely as important. The clinical scientist must have beds of his own, preferably not a large number, but he should be very willing too to confer on cases with his colleagues of the honorary staff, to stimulate their subordinates by his ideas and activities, and, while nursing his own interest, to become an active member of the larger hospital family.

He may have to accept that his scientific preoccupation with his problems entails a limitation of his clinical sense. Clinical sense is born partly of long and varied and comprehensive association with sick men, women, and children, and partly of the very nature of that relationship. I am not here hinting at the likelihood of his failing in sympathy with his patients, but rather at the inevitable absorption of interest by a finite problem to the exclusion of a full appreciation of the numerous other factors at work behind the whole and complex human problem. However defined or separate a disease-process may be, it tends to present in different ways and to have different effects in individuals. Hospital patients, from environmental circumstance, are less easy to "know" than private patients. The physician learns more clinical sense, as a rule, from his private patients than from his hospital cases. He also acquires methods of approach and management which are sometimes of particular value in clinical assessments and are, on the whole, less easily acquired by the institutional research worker. Let us accept, however, that the clinical scientist is concerned rather with processes than with persons, and that his study of processes is not necessarily hampered, as the task of the physician would be, by limiting his view.

In the matter of the education and selection of research personnel it has really come to this: can we ask our promising younger men to afford the time necessary for both disciplines, that which trains for clinical sense and that which trains for clinical science? Or, given a close association with other

1. *Brit. med. J.* 1930, **1**, 479.

clinical workers, should we accept as suitable for clinical research men whose preliminary training has been predominantly pathological, physiological, or biochemical? At what stage, too, are they to be selected? And what are their later prospects?

On all these matters I speak with interest and feeling and would seek advice because I am experimenting myself at the moment in the provision, simultaneously, of a clinical and scientific discipline for my research workers at Cambridge. At present, most of the appointments are necessarily made from candidates whose training has been mainly clinical. Their physiological or biochemical methods have thus to be acquired or reacquired. This takes time, and aptitude may not always be forthcoming. And yet, much as I should welcome recruits from other departments, I should not view with confidence the appointment of laboratory-trained men lacking at least a year or two of stern clinical discipline after qualification, a discipline without which the nature of the problems to be explored can never be fully apprehended.

For our purpose, at Cambridge, we have, on the one hand, the facilities afforded by the generous coöperation of my colleagues at Addenbrooke's Hospital and our association with them in their routine work, and, on the other, those deriving from the example and method and direct influence of senior workers in our own and the other university science laboratories.

At University College Hospital, Lewis and his co-workers have chiefly carried physiological method into the clinical field. At Cambridge it is more likely that biochemistry will implement and direct our studies in the near future. But in neither place is it likely that one science alone will be called to the aid of the research-physician. In neither place will other biological methods remove the necessity for close observational method and training. Field-work, follow-up inquiry, metabolic-balance experiment, transfer of a clinical problem to the experimental field, employing animals or healthy men—each and all will be invoked as occasion requires.

As to the future of our younger clinical scientists a small proportion only will remain in academic medicine; but the others will return to teaching and practice bearing a new torch kindled by new training and criticism.

Now the new centres of activity will look for their recruits not only to the university departments but also to the great teaching hospitals in London. And so I would once more beg of my friends in the metropolitan schools and elsewhere to search their hearts in the matter of medical education, both clinical and pre-clinical, and to aim at so training their students that the coming generations of doctors may develop a clinical sense that is more highly developed, more scientific and critical, and that the coming generations of clinical scientists may still retain that "faculty of perception" which has been the hall-mark of English medicine from the time of Sydenham.

The biological scientists have sometimes tended to look askance at the work of the clinician because his methods are crude and his standards of inquiry and criticism too low. They have had no opportunity, not having experienced them, of appreciating the countless difficulties and interruptions to consecutive thought which the life of practice or practice combined with teaching compels. The clinician, on the other hand, has tended sometimes to belittle the work of the laboratory man who would advise or assist him, knowing his lack of intimacy with the problems of personality, with the variability of diseases and symptoms, and with the severe limitations set by chance, by the shortage of beds, and by the tide of individual human affairs to experiment and consecutive observation in the hospital ward. Mistrust of this kind is unnecessary and foolish, and all occasion for it departs when there is close and friendly association between the practising physician and the investigator within the same building. If the first and constant duty of the physician is to improve his clinical sense, his second is to preserve the closest possible contacts with all the related biological sciences. These sciences in return can derive undoubted inspiration from the daily experience and difficulties of the ward.

THE HOSPITAL AS A UNIVERSITY UNIT

Certain hospitals in the past, with no loss but rather with infinite gain to the patient and the community, have provided our schools of medicine, the training centres for observational and therapeutic study. Certain hospitals in the future, while retaining all their freedom for loyal and humane service to the community, will, I believe, become integral units of our university system and, as centres for training in scientific medicine, will contribute to the advancement of learning in a manner and degree as yet scarcely contemplated. When science and practice work at close quarters both must benefit, just as already teaching and practice win mutual gain from contiguity.

On one thing I feel sure you will agree: that in spite of all our difficulties the modern evolution of medicine is intensely interesting and full of promise. I hope you will also agree that it is occasionally worth while to take stock, as I have tried to do this evening. For my own part, I am less anxious about the immediate future of clinical science than I am about the future of clinical teaching. To forget or forego the discipline that assists the faculty of perception would be a calamity for which no other discipline could wholly compensate. It should not, however, be beyond us to discover how the training both of sense and science in a better manner than heretofore may become the prerogative of all our students.

". . . Eugenics is founded upon the doctrine of the natural inequality of man. The extent to which men differ by nature is a question upon which people are inclined to have different opinions on the basis of their political or social philosophy. Those of aristocratic leanings like to think that distinctions of rank and station go along with rather marked differences in hereditary endowment. Champions of equal rights, those who do battle against the powers of vested privilege, take comfort in the thought that the native qualities of the privileged classes are no better than their own, if as good. . . . Much of the opposition to eugenics is primarily a sort of defense reaction arising out of a concern for ideas or sentiments to which eugenics is felt to be somehow antagonistic. . . . As eugenists, we are committed to no particular social, religious, political or economic creed, that we are no more concerned with the class war than the botanist or astronomer, that we are quite willing that Mary should marry Jack or any one else provided their progeny will probably not be imbeciles, lunatics or otherwise a burden to society; that we would like to have relatively more progeny from people with fine hereditary endowments, although we do not have the remotest intention of recommending any coercive measures for the attainment of this end; that we look to education and the development of eugenic ideals as affording the basic conditions for any noteworthy eugenic improvement. . . . . With these aims all intelligent and fair-minded people, I think, can not fail to be in accord."—Prof. S. J. HOLMES, *Science*, April 21, 1939, p. 351.

CONTROL OF *STAPHYLOCOCCUS AUREUS* IN AN OPERATING-THEATRE

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THE investigation described in this paper was prompted by the occurrence of suppuration in a large proportion of patients after "clean" operations by the surgical unit of University College Hospital. In most wounds the suppuration was obvious on the fourth to the fifth day after operation, though in some it appeared later. It was relatively superficial in some—e.g., in the rectus sheath in most of the laparotomies—though in one case staphylococcal peritonitis developed. The infection was usually deep in suppurating thyroidectomy and thoracoplasty wounds. With the exception of one *Streptococcus pyogenes* infection, suppuration was due to *Staphylococcus aureus*. We have recorded the results of the investigation because our conclusions differ from those of recent American investigators who indict the air as the main source of staphylococcal infection in operation wounds.

Sources of *Staph. aureus*

The routine sterilisation of instruments, ligatures, lotions, dressings, gowns, masks, and gloves was reviewed and found satisfactory. Broth cultures from ligatures, instruments, and instrument-rinsing saline were made at the end of a number of operations and found free of *aureus*. There remained for consideration the air of the theatre, the skin of the patient, and the skins and upper respiratory tracts of the theatre staff.

Methods of sampling and identification of cultures.—Direct plating on 5 per cent. horse-blood agar was employed whenever possible. Broth cultures were not more sensitive in revealing small numbers of organisms and gave no idea of the number of organisms originally present. The skin was sampled with a broth-moistened swab rubbed with a circular motion twenty times over an area 4 cm. in diameter. The swab was plated as soon as possible after taking. The nose was sampled with one swab through both nostrils.

All plates were incubated for a day at 37° C. and for two days at 18° C. in a north light to facilitate the production of pigment. All golden and white colonies consisting of typically arranged monomorphic cocci 1μ in diameter were tested in mannitol; and all strains that fermented mannitol within three days were tested for the production of coagulase.

We have called *Staph. aureus* only those organisms which produced coagulase. A few coagulase-positive white strains have been included in the *aureus* group. In effect, this is the practice of Cowan (1938a), who found that the correlation between the production of coagulase and that of hæmolysin was complete, and who grouped the hæmolysin-producing staphylococci, irrespective of the production of pigment, into one species, *Staph. pyogenes*. Since most of our coagulase-positive strains yielded golden colonies, we have for the present retained the more familiar label of *Staph. aureus*.

The production of coagulase is not a constant feature of those cocci that on all other counts should be classified as pathogenic *Staph. aureus*, but in most recent surveys of staphylococci (Cowan 1938a, Chapman et al. 1938) the proportion of coagulase-negative strains has been small. Moreover, since all those strains from the suppurating wounds that we tested were coagulase-positive, the disposition of coagulase-positive staphylococci in the operating-theatre seemed likely to reflect the disposition of all pathogenic *Staph. aureus* adequately enough for the solution of our problem.

AIR

Plates were exposed near the instrument table during operations; twenty-five for an hour, forty-nine for half an hour, and thirteen for 35–120 minutes. Half-hour plates, being least crowded with colonies, are best for investigation. The plates were counted after incubation for a day at 37° C. and three days at 18° C.

A total of 4894 colonies, mostly of air saprophytes, grew on plates exposed for a total of 63·6 hours, an average of 77 per hour. Eleven plates showed *Staph. aureus*: 4 colonies twice, 2 colonies twice, and 1 colony seven times; a total of 19 in 63·6 hours, or 0·3 *aureus* colonies per hour on a plate 12 sq. in. in area.

This is the best available estimate of the continuous risk of infection by *aureus* from the air, though it must vary with the state and staff of the theatre. The area of an operation exposure is also usually about 12 sq. in. and the direct settlement on it of one *aureus*-bearing particle every three hours is not an obvious danger.

But air-borne *aureus* settling on instruments, on swabs, and on the gloves and sleeves of the surgeon may also be carried into the wound. Meleney (1935) assumed that patient, surgeon, assistants, tables, and instruments constituted the area at risk, which he estimated at 4000 sq. in.—i.e., 333 times the plate area. On this basis $0{\cdot}3 \times 333 = 100$ *aureus* menaced the wound in an hour.

But in fact only a few of the objects in this area are introduced into the wound. It is unlikely that the total area of wound and objects introduced into it will be more than say, that of a 24×18 in. instrument table—i.e., 432 sq. in., which is 36 times the plate area. On this basis $0{\cdot}3 \times 36 = 11$ *aureus* menace the wound every hour.

PATIENT'S SKIN

Twenty-four to forty-eight hours before operation the skin was shaved, washed with ether soap and water, ether and alcohol, and finally a 1 in 1000 solution of flavine in spirit. The area was sterilised a second time with the flavine paint when the patient was on the table. Swabs were taken immediately before the second application of antiseptic, and *aureus* was found in 4 of 50 skin-plates (9, 2, 1, and 1 colony). Swabs taken after the second application were heavily charged with flavine and usually sterile. It may be assumed that the antiseptic preparation is reasonably effective in killing *aureus* on the superficial layers of the skin.

Staph. aureus may survive in crypts of the skin, to be released during operation by sweating or by section of a crypt during incision. The low incidence of *aureus* in the partly sterilised skin does not account satisfactorily for a high incidence of *aureus* suppuration.

NOSE AND SKIN OF THEATRE STAFF

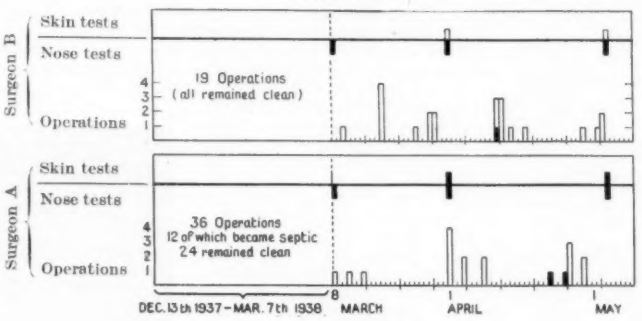
At the time of maximal incidence of sepsis skin samples from the back of the right wrists and nasal swabs were taken from forty persons, including senior operating staff, theatre and ward nurses, dressers, and a few adult patients in the male ward. Eighteen of these were more or less pronounced nasal carriers, and two of these were skin-positive; one nose-negative person was skin-positive.

With these tests an estimate was made of the incidence of staphylococci infesting various situations. The infestation was high in the nasal cavities, and the carrier-rate agrees with that found in larger surveys of *aureus* carriers (see McFarlan 1938); it was low on the skins tested and in the air. It was impossible to discover whether the particles in the air giving

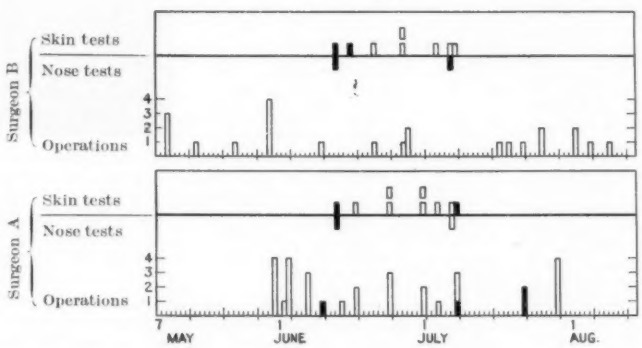
rise to *aureus* colonies contained more than one coccus. But the slow development of, and the uniform size attained by, the *aureus* colonies, compared with the growth-rates of colonies from experimentally seeded single cocci, exclude the possibility that initially there were very large numbers of cocci in each colony-producing particle. We have already assumed that the *Staph. aureus* air menace was, on the average, eleven particles an hour. Even if each consisted of twenty cocci, they would be unlikely to settle in one part of the wound, and the odds against an inoculum of twenty cocci getting a foothold in relatively healthy tissue must be high. The rarity with which very small doses of known pathogens can be made to infect susceptible animals, even after passage, makes it unlikely on a priori grounds that *aureus* infection would occur readily in such circumstances. We have, however, no direct evidence on the point. Aside from these speculations we have evidence that the air was not responsible; for, whereas its average *aureus*-content remained constant, the suppuration disappeared, although no attempt was made to prevent the access of air bacteria to the operation wounds. In any event the constancy of infection at the outset of this investigation suggested a source of *aureus* more constant than the air proved to be. On the other hand, the danger from a pronounced nasal or skin carrier in the operating staff should be minimised by the use of masks, gloves, and gowns. The implication of any one source, in the absence of more extensive data, would have been a matter of conjecture had not the incidence of infection proved to be closely associated with one surgeon. Most of the operations were performed by surgeon A or surgeon B, and in table I the association of sepsis with A is clearly seen (see also fig. 1A). Of 54 "clean" operations performed by A in a five months' period, 14 were infected by *Staph. aureus*, and only 1 of 41 operations by B in the same period.

Table V shows that, during the year under consideration, the operations performed by A and B were comparable; hence the suppuration in A's case was not due to a difference in the operative material of the two surgeons. Both A and B used the same staff and theatre, and often both operated in the same session. The infection apparently depended on the intimate contact of operator with patient, for at many of the operations B assisted A and A assisted B. The difference in the incidence of infection in A's and B's cases is such that the odds against it arising by chance are over 200 to 1. The cause of the infection was therefore to

FIG. 1A



B



C

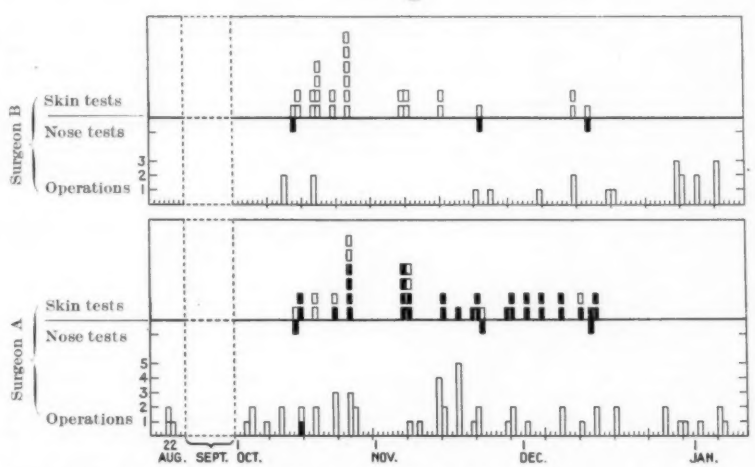


FIG. 1—Chart of operations and nose and skin tests for the presence of *Staphylococcus aureus*. White columns indicate (1) negative results of tests, and (2) operations not followed by suppuration. Black columns indicate (1) positive results of tests, and (2) operations followed by suppuration due to *Staph. aureus*. **A**, Preliminary period under ordinary conditions; **B**, period during which operators wore battiste oversleeves and cellophane in masks; **C**, period in which additional manipulative care was taken.

be looked for in some essential difference between A and B; it was unlikely that *aureus* in the air, on instruments, or on the skin of the patient was responsible.

Both A and B were persistent nasal carriers of *Staph. aureus*, and platings of their nasal swabs showed several hundred *aureus* colonies. B's nose was the more infested of the two, the swabs often yielding an apparently pure culture. The results of swabbing A and B and the incidence of *aureus* infections in their patients are shown in fig. 1, which records the *aureus* history of the two surgeons from Dec. 13, 1937, to Jan. 11, 1939, omitting the month of September, 1938.

TABLE I—INCIDENCE OF *Staph. aureus* SUPPURATION IN CLEAN CASES (DECEMBER, 1937, TO MAY, 1938)

Surgeon	*Aureus* cases	Non-infected cases	Totals	Sepsis (per cent.)
A ..	14	40	54	25·9
B ..	1	40	41	2·4
Totals ..	15	80	95	15·3

$n = 1$, $\chi^2 = 8{\cdot}00$, and $P = 0{\cdot}0047$ (see Hill 1937).

Staph. aureus might fall from the nose or mouth on to the wound in heavy droplets spat through the mask or pass from the skin through holes in rubber gloves or through the sleeves of an operating-gown. These possibilities were investigated as follows.

Masks specially designed to prevent the discharge of infected droplets are usually tested by placing culture plates in the line of possible discharge and instructing the wearer to cough (for references to recent work on mask tests see Arnold 1938). We adopted a more stringent test of permeability. After use the mask was laid nasal side upwards over a blood-agar plate and its outer surface lightly and evenly pressed on to the agar by a sterile 3½ in. rubber bung. By this means all the *aureus* capable of being brushed off the outside of the mask were sampled, and any mask that was *aureus*-free on its outer surface after operation might be safely assumed to be impermeable to the coccus. Nineteen tests were made on 4 carriers wearing masks without efficient cellophane. On the average the masks were worn for 100 min. *Staph. aureus* was found on six occasions; the colonies totalled 126. Of sixteen tests on 2 carriers with efficient cellophane in the masks, fifteen were negative. The masks were worn for 110 min. on the average, and in the single positive test only one *Staph. aureus* colony was found.

The ordinary theatre masks, made of two layers of butter muslin, let *aureus* through. A loose sheet of cellophane introduced between the folds of the muslin just before operation was ineffective, for it crumpled and slipped during the operation, and the mask was still permeable to *aureus*. A 6¾ by 8¾ in. sheet of cellophane (No. 600 P.T. Messrs. Pakcel Ltd.) was sewn into a 7 by 9 in. pocket made in the middle of the upper border of a mask of double-folded muslin, 36 by 15 in. and sterilised in situ. The resulting mask was impermeable to *aureus*.

In the sixteen tests of A and B in these masks only one *aureus* colony was found on the outside; other colonies consisted of typical air saprophytes. Press-plates of the inside of these masks showed nasal and mouth flora, with *aureus* present in all those tested that had been worn by carriers.

The air discharged laterally from the edges of the mask might carry very fine droplets containing *aureus*. Blatt and Dale (1933) find this lateral discharge to be "practically sterile," but even if *aureus* escaped from the carriers in this way it would contribute merely to the already determined air-infestation, for droplets small enough to be carried out on this lateral discharge would have insufficient weight to fall directly on to the wound.

In the small number of mask tests there was no obvious difference between A and B.

Gown sleeves.—The gowns were of coarse linen, 48 meshes to the inch. The irregularity of the threads and the large size of the holes in this cloth are illustrated in the photomicrograph (fig. 2).

Press-plates of the outside of gown sleeves alone and of stockinette oversleeves worn over gown sleeves showed *aureus* at the end of the operation, but the introduction of batiste (British Pharmaceutical Codex 1934, p. 1136) oversleeves to cover the gown sleeves reduced the incidence of *aureus* on press-plates to one colony in forty-one tests on A and B.

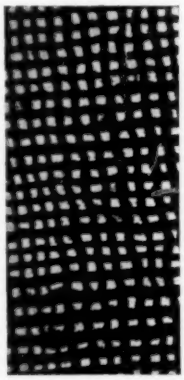


FIG. 2—Photomicrograph of linen sleeve of operating-gown. (× 5.)

The difference between A and B (table II) is obvious. There was a similar difference in the skin swabs of A and B, 6 of 8 skin swabs of A, but only 2 of 10 swabs of B, being positive in a period of seven months. Moreover, on five occasions scalpel-scrapings of B's skin were *aureus*-free.

These results suggest that the relevant difference between A and B was that, though both were nasal carriers, the skin of A was the more constantly infested with *aureus*, and that *aureus* was sweated through the gown sleeve of A during operation. This belief was strengthened by the results of testing the hands of A and B.

Operating-gloves.—Staph. aureus that survived scrubbing-up and disinfection of the surgeon's hands could get into a wound only through a puncture in the glove. Glove puncture is a relatively common accident. The leaks are more certainly discovered if an under-water test is made. In table III the puncture-rate in 6965 gloves is recorded.

The first series contains those worn in the main hospital theatres over a period of four months and includes both patched and unpatched gloves, 6585 in number; in these the incidence of puncture was 24 per cent. The second and third series comprise tests on unpatched gloves worn by A and by B, chief assistants, and instrument nurse in sixty-nine operations; 14·5 per cent. were punctured. In the last two series 48 of the 55 punctures were in the thumb, index, and middle fingers: 22 on the right hands, 26 on the left.

TABLE II—GROWTH ON PRESS-PLATES FROM THE OUTSIDE OF LINEN AND STOCKINETTE SLEEVES AND OF BATISTE ARMLETS

Surgeon	Sleeve material	Tests	Average time worn (min.)	*Staph. aureus*	
				Times found	Total colonies
B	Linen, &c.	16	64	2	2
	Battiste	13	62	0	0
A	Linen, &c.	31	71	8	50
	Battiste	28	60	1	1
5 others	—	11	45	0	0

There is thus the opportunity for the leakage of *aureus* from the skin of the hand. It remains to

be shown that (1) *aureus* was present on the hands of A but not of B, and (2) it could leak through punctures.

(1) The infestation of sterilised hands by *Staph. aureus* was tested by making 121 press-plates of the inside of A's and B's gloves immediately they were peeled off at the end of an operation. The number of colonies developing depended more on the amount of sweat in the glove than on the length of time the glove had been worn. A glove that was dry after two hours' wear might yield 20 colonies, whereas a sweating glove worn for only 30 minutes might yield 500–1000. Moderately wet gloves often yielded colonies grouped in clusters, which were composed of only one or two types of colony. Clustering appeared in 60 per cent. of moderately crowded plates and gave the impression that each cluster had arisen from a circumscribed area on the skin, such as a pocket or crypt filled with one or two kinds of micro-organisms. Table IV records the tests on the right- and left-hand gloves of A and B after operations lasting 20–180 minutes. A's hands "excreted" *aureus* 30 times in 42 tests, the number of colonies varying from 5 to 5000. The total number of colonies was about 1·5 to 5 times the number of *aureus* colonies, the commonest non-*aureus* organism being a non-mannitol-fermenting coagulase-negative strain of *Staph. albus*. B excreted far fewer colonies, counts of more than 100 being rare; and *Staph. aureus* was never found. His common organisms were *Staph. albus*, pleomorphic gram-positive cocci, and diphtheroids, in that order of frequency. As soon as the danger from A was realised, additional care was taken to avoid glove-puncture during operation: fingers were introduced into wounds as little as possible and instruments used for manipulation wherever possible (fig. 1c). The capacity of *aureus* for leaking through holes in the gloves was estimated by experimental puncture.

TABLE III—INCIDENCE OF PUNCTURES IN OPERATING-GLOVES

Wearers	Gloves tested	Punctures and per cent.	Consecutive operations
Hospital staff in main theatres	6585	1593 (24·2)	—
Surgeon A	81	11 (13·6)	42
Surgeon B, chief assistants, and instrument nurses	299	44 (14·7)	69

TABLE IV—GROWTH ON PRESS-PLATES FROM THE INSIDE OF GLOVES AFTER OPERATION

Surgeon	Tests	Aver. time worn (min.)	Distribution of plates according to approximate number of colonies thereon						Times *Staph. aureus* found
			Colonies ..	0	1–50	51–500	501–5000	5001+	
A	42	80	*Aureus* cols.	12	4	16	7	3	30
			All cols. ..	1	7	15	16	3	—
B	29	77	*Aureus* cols.	29	0	0	0	0	0
			All cols. ..	4	20	5	0	0	—

(2) During a period when the infestation of A's hands by *Staph. aureus* was pronounced experimental punctures were tested as follows. At the finish of an operation the gloves were washed before removal, rinsed with alcohol, and dried on a sterile towel. The finger-tips and knuckles were lightly pressed on to a blood-agar plate as a control culture and then punctured and pressed on to a second plate. After puncture press-plates were made of the inside of the glove, as described above. Twelve tests were made. Test 1 is illustrated in fig. 3. Large holes were made by a needle, and several hundred *aureus* came through. Smaller needle pricks were ineffective in two tests. In surgical practice a very small hole might be temporarily enlarged when the rubber immediately surrounding it is stretched during operative manipulation. Accordingly, in four tests a sterile 2 in. glass disk was manipulated after the puncture in such a way as to stretch the rubber at the finger-tips, and its surface was rubbed over blood agar; in two tests *aureus* leaked through. In five further tests the puncture was made with a No. 25 × 1 in. hypodermic needle, and 0·2 c.cm. of sterile saline was introduced. The fingers were lightly massaged together and then stroked on to a plate. *Aureus* leaked through in all five tests. In all, leakage occurred in eight of twelve tests.

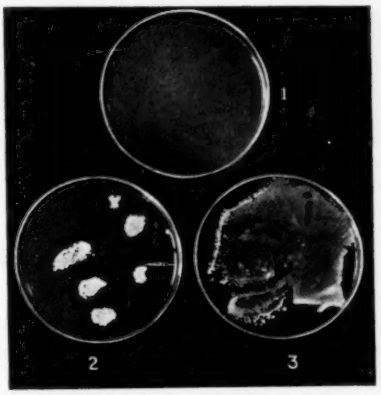


FIG. 3—Photographs of press-plates. (1) Culture from outside of glove before pricking; (2) culture from outside of glove after pricking; (3) culture from inside of glove. About half the colonies are of *Staph. aureus*.

The leakage of *aureus* apparently depends on a sufficiency of organisms and fluid—i.e., sweat in the natural condition—inside the glove and on the coincidence of the puncture with an *aureus*-producing area of the hand. With excessive sweating the *aureus* is disseminated throughout the space between rubber and skin, and any prick may be the site of an *aureus* leak. The average number of cocci escaping through leaks in A's gloves was very much greater than that likely to fall on to one spot in a wound from the air, or to be introduced on air-infected instruments, or on sleeves through which *aureus* has been sweated. Both the *aureus* infestation and the opportunity for implantation in the wound were greater in the hand than in all other sources tested. In the light of the available evidence it is the *Staph. aureus* on A's hands that must be considered to be the chief source of the suppuration.

Effect of Precautionary Measures

Except emergency operations and those in which there was a possibility of wound infection from conditions found at operation, all "clean" operations performed by the staff of the surgical unit from Dec. 13, 1937, to Jan. 11, 1939 (September, 1938, excluded), have been watched, and the subsequent progress of the wound followed, by one observer. Of 262 operations performed by four surgeons, 22 suppurated frankly and small pustules round the

stitches developed in 7. Disregarding these 7 cases, since necrosis from excessive tension on the stitch probably contributed to the lesion, 8·4 per cent. of the cases suppurated. This figure is about the same as that reported by other observers for the general incidence of suppuration in clean operation wounds (Ives and Hirshfeld 1938, Meleney 1935). The record for each of the four surgeons is as follows :—

Surgeon	A	..	Total	141	..	Suppurated 20
,,	B	..	,,	84	..	,, 1
,,	C	..	,,	22	..	,, 0
,,	D	..	,,	14	..	,, 1

Fig. 1 and table V record the operations of A and B. It will be noted that 4 wounds in A's series suppurated after the introduction of cellophane masks and batiste sleeves (fig. 1B) and 1, a thyroidectomy wound made on Oct. 14, 1938, after the modification of the operative technique (fig. 1C) described in the text. After this operation the left index finger of the glove was found punctured, and a press-plate of the inside of the gloves yielded a heavy growth of *Staph. aureus*. Between Oct. 14, 1938, and Jan. 11, 1939, A performed 45* clean operations without suppuration, even though during this period *Staph. aureus* was repeatedly grown from the inside of his gloves and his gloves were occasionally punctured. This observation confirms the conclusion reached by the tests—namely, that the leakage of an infective dose of cocci from a skin carrier is determined by more than mere puncture of the glove.

Discussion

Staph. aureus was found in various parts of the operating-theatre and its staff. A precise definition of the infection risk from the different sources of *Staph. aureus* is impossible, for the discovery of a likely source was necessarily followed by immediate attempts to stop it. Nevertheless, the staphylococcal history of surgeons A and B in the operating-theatre strongly suggests that the main danger lay in the *aureus* infestation of A's skin. Wells and Wells (1936, 1938) have in the past few years emphasised the importance of the air as a vehicle of pathogenic bacteria, and Hart (1937) has advocated the sterilisation of the air in operating-theatres by ultraviolet light. Without minimising the importance of the Wells's observations or denying the efficacy of Hart's methods of sterilisation it is questionable whether postoperative *Staph. aureus* suppuration is necessarily due to air-borne cocci. Our experience is limited to one surgical unit, but the striking decline of the sepsis-rate, in the face of a continued *aureus* menace in the theatre, suggests that in other cases the improvement due to a greater nicety of operative technique may have been wrongly attributed to the elimination of air-borne pathogens. Indeed Hart, in his latest report (1938b), attributes his avoidance of sepsis to "meticulous operating room asepsis, development of a delicate atraumatic technique, and the use of the least irritating suture material" besides "the elimination of air-borne contamination." It is obvious that surveys of a number of operating units should be made (cf. Hart 1938a) to decide on the incidence and importance of air-borne *aureus*. For this purpose it is important to fix a standard method of measuring the number of air organisms present and criteria for the recognition of pathogenic strains. The air centrifuge of Wells and Wells is at present too expensive for general adoption as a means of sampling the air.

We suggest that the best readily available measure of the infestation-rate by *aureus* is the average number of colony-forming particles falling into a 4 in. petri dish per hour, calculated from colony counts of blood-agar plates exposed for 30 min. each. A limited number of experiments we have made indicates that four such plates grouped round the patient, at operation-table level, provides a representative sample of the air organisms. The proportion of plates contaminated with a given pathogen has been used as a measure of infestation of the air, but this figure gives a false impression of the risk. For example, from our data, 17 per cent. of 63 one-hour plates would have shown *Staph. aureus* in the 63 hours tested, a misleadingly impressive figure compared with an average rate of 0·3 *aureus* per hour. The definition of potentially pathogenic *Staph. aureus* must, in the present state of classification of the staphylococci, be more or less arbitrary. A study of over 800 plates seeded with material from air, dust, skins, and nasal cavities has convinced us that neither *Staph. aureus* nor *Staph. albus* can be safely identified by the appearance of the colony and the stained smear (criteria apparently adopted by many observers). The most useful single criterion is provided by the coagulase test. This may be combined, if desired, with the test for production of α-hæmolysin (McFarlan 1938), and all golden, yellow-gold, and white colonies, made up of monomorphic cocci that ferment mannitol, should be so tested. There is the same need for agreement about the criteria for recognising other air-borne pathogens. It is obvious from recent work that hæmolytic streptococci cannot be regarded as potentially pathogenic unless they belong to the A, B, C, or G groups of Lancefield and Hare (Topley and Wilson 1936). If a relatively high degree of *aureus* infestation were demonstrated in the air of any theatre, a high risk of wound infection would not necessarily be implied. A properly controlled test of the infectivity of small doses of *aureus* in human tissue is impossible. We must rely on circumstantial evidence, and from the result of our own experience we suggest that, before the air is indicted as a source of danger, the sources we have demonstrated in our own theatre should be tested and stopped.

The evidence pointing to the skin infestation of surgeon A, as the feature distinguishing him from the non-infective surgeon B, not only rules out air-borne cocci and those on the patient's skin but also those in the noses of both A and B as causes of the suppuration. But in other circumstances the patient's own cocci and the surgeon's nasal cocci might well be dangerous, though risk of direct infection from the nose can be removed by the use of an efficient mask. The mask we devised is both efficient and comfortable. The skin carrier presents a greater problem. *Staph. aureus* can be sweated through a gown sleeve, and the conditions inside a surgical rubber glove promote the "excretion" of *Staph. aureus* from a previously well sterilised skin.

Apart from the solution of our immediate problem, the general applicability of our conclusions depends on the prevalence of *aureus* skin infestation among practitioners of surgery. Surgeon A is not an isolated example of *aureus* skin infestation. About the middle of 1938 surgeon D was nose- and skin-negative. Shortly before an attack of *Staph. aureus* boils he operated on one patient whose wound subsequently suppurated. After the attack he was found to be a nasal carrier and subsequently sweated *Staph.*

* From Jan. 11 to April 17, 1939, surgeon A performed 35 consecutive "clean" operations. His skin was still infected with *Staph. aureus*; no suppuration developed in any of the wounds.

aureus into his gloves at operation. The discovery of surgeon A's nose and skin infestation followed an attack of boils some months previously. It may be that heavy infestation of the skin is the result of recent manifest infection.

A's nasal and skin strains behaved identically in all the tests applied. They were coagulase-positive; both produced α-hæmolysin and leucocidin to the same high titre in parallel tests; and both were type IIIa by Cowan's (1939) slide agglutination-test. It is of interest that the nasal strains of A and D, who were skin carriers, produced high-titre leucocidin of the Panton-Valentine type. B was a heavily infected nasal carrier. He rarely had *aureus* on the skin, and his nasal strain was leucocidin-negative. It is tempting to relate the dependence of skin infestation in nasal carriers to the pathogenicity of the nasal strain, as indicated by the production of leucocidin (Valentine 1936); but B's carrier state followed an acute staphylococcal sinusitis complicated by orbital cellulitis and osteomyelitis of the frontal bone, and, if the carrier strain is the same as the original infecting strain, its lack of leucocidin here at any rate does not indicate lack of pathogenicity. The relationship between nasal and skin infestation, and between recent skin infection and the skin carrier state, cannot be discussed profitably on such scanty data; these problems are being investigated. The evidence so far obtained indicates that there is an appreciable skin carrier-rate in the hospital community, though it does not approach the rate of 30–40 per cent. found in the nasal cavities.

TABLE V—CLASSIFIED OPERATIONS PERFORMED BY A AND B FROM DEC. 13, 1937, TO JAN. 11, 1939 (SEPTEMBER, 1938, EXCLUDED)

Type of operation	Surgeon A		Surgeon B	
	Healed	Suppurated	Healed	Suppurated
Herniotomy, inguinal and femoral	15	1	12	0
Herniotomy, scar	2	1	1	0
Excision of plantaris tendon	13	2	5	0
Partial thyroidectomy	9	4	8	1
Phrenic avulsion	2	0	3	0
Other operations on neck	1	3	4	0
Thoracoplasty	8	3	3	0
Extrapleural artificial pneumothorax	12	0	2	0
Other chest operations	5	0	0	0
Radical mastectomy	3	0	2	0
Other operations on breast	3	0	3	0
Laminectomy	4	0	0	0
"Cold" appendicectomy	3	0	3	0
Laparotomy and intra-abdominal operations	15	6*	4	0
Operations on limbs and limb-joints	20	0	27	0
Other operations	6	0	7	0
Totals	121	20	84	1

* In one case of these six the infection was due to *Strep. pyogenes*; the remainder listed in the table were *Staph. aureus* infections.

Turning to the surgical aspect of the problem, it will be seen from table V that thyroidectomy, thoracoplasty, and laparotomy wounds suppurated most often. It is perhaps significant that in these operations the amount of stitching necessary, and therefore the risk of glove puncture, is relatively great, though of course stitching is not the only procedure during which gloves may be damaged. The possibility of infecting a wound by a leak of bacteria through a glove puncture has long been recognised. When in 1895 Lane (1909) introduced his method of plating simple fractures he was well aware of this danger and in the description of his technique emphasised that the fingers should never be introduced into the wound and that "the instruments should be long . . . in order to avoid any contact with the wound by the portion of the instrument grasped by the hand since . . . the gloves are liable to be damaged." This accident is more frequent than is generally supposed; thus 24 per cent. of the gloves used in the theatres of the main hospital were punctured. It may be objected that this figure includes gloves worn by students and nurses, and that the surgeon would be less likely to puncture his glove; yet of the surgeon's gloves alone 14 per cent. were punctured at a time when special care was being taken to avoid damage. In a few instances the puncture was discovered immediately it was made, but most of the holes were found on testing the gloves at the end of the operation, by which time there had been maximum opportunity for leakage. Leakage is a danger only in skin carriers of pathogenic organisms like *aureus*. Our results show that the carrier state may be more certainly demonstrated if press-plate cultures of the inside of rubber gloves into which the subject has sweated are substituted for the usual procedure of skin swabbing.

There remain for consideration a few other measures that have been advocated for the reduction of sepsis. If the air can be shown to be the source of infection (Cowan 1938b) its sterilisation by such agents as ultra-violet light (U.V.L.) or aerosols (Pulvertaft et al. 1939) is of obvious importance. It is possible that the success of Hart's U.V.L. is due less to air sterilisation than to the sterilisation of bacteria that have reached the wound from all sources, though the relatively poor penetrative powers of U.V.L. make it unlikely that heavy inocula will be destroyed. Hart (1938b) records that in one of the thoracoplasty wounds which suppurated badly in spite of U.V.L. irradiation, it was known that the wound was contaminated with sweat escaping from a torn glove. Meleney (1935) stated that the substitution of silk for catgut as ligature material reduced the incidence of wound infection. We have no evidence that the ligature material has any influence on the incidence of wound infection, which depends on the introduction into the wound of an infective dose of bacteria. In the light of our experience we would attribute the success of Meleney's technique to the greater nicety of operative procedure that he found necessary with silk. Hart (1938a) has suggested that so far as possible nasal carriers of *Staph. aureus* should be excluded from the theatre. The risk from this source is not necessarily great, and in view of the high *Staph. aureus* carrier-rates recorded in hospital communities such exclusion may be impracticable. For example, in one week during the period recorded we should on this account have excluded the two senior surgeons, one house-surgeon, one theatre sister, two nurses, and one dresser out of a staff of fourteen.

The removal of *Staph. aureus* from the skin of a carrier presents a problem yet to be solved. A course of U.V.L. had no effect on the coccal infestation of Surgeon A's skin. There remains the possibility

of applying antiseptics, such as Dettol cream, to the hands before operation, as recommended by Colebrook and Maxted (1933); but in view of the marked infestation of A's hands with *Staph. aureus* we were unwilling to risk any damage to the skin tissues that might have an infective sequel. The problem was less urgent than it might have been, for other prophylactic methods were completely successful. However, so long as the skins of A and D remain infested, we cannot expect a continued freedom from wound suppuration. The problem of carrier cure is still under investigation.

Summary

(1) A high incidence of suppuration due to *Staph. aureus* in "clean" operation wounds was found to be due to the leakage of *Staph. aureus* through glove punctures from the skin of one surgeon who proved to be a skin carrier.

(2) The *Staph. aureus* present in the air of the theatre and on the skin of the patients operated upon apparently played no part in the incidence of suppuration.

(3) Nasal carriers of *Staph. aureus* among the theatre staff do not constitute a danger, provided that masks are made impermeable to direct droplet discharge from the nose and mouth.

(4) All the strains of *Staph. aureus* recorded fermented mannitol and produced a coagulase for human plasma.

(5) Skin carriers, negative by the ordinary swabbing tests, may sometimes be detected by cultivating the sweat from the inside of rubber gloves at the end of operation. This method has the advantage of excluding positive results due to temporary superficial contamination of the skin.

(6) The frequency of glove puncture during operation was found to be as high as 24 per cent.; this was reduced to 14 per cent. by precautions to avoid puncture.

(7) The following measures were followed by disappearance of the sepsis: (*a*) the introduction of cellophane sheets into butter-muslin masks; (*b*) the wearing of batiste (B.P.C.) sleeves over linen gowns to prevent the escape of skin cocci in sweat; (*c*) the avoidance of glove puncture during operation by special attention to operative technique; and (*d*) the avoidance, so far as possible of direct handling of the tissues.

We are indebted to Dr. S. T. Cowan and Dr. F. C. O. Valentine for serological and leucocidin-production tests on some of our *aureus* strains; and to Dr. O. Khairat for fig. 3.

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ABDOMINAL RESECTION FOR RECTAL CANCER*

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THE operation of abdominal resection for a high rectal growth has had more advocates on the Continent than in this country. Sometimes known as Hartmann's operation (Hartmann 1923), or anterior resection, it has been ignored by many of our textbooks, though descriptions of it have been given at various times by Rankin (1929), Gordon-Taylor (1929–30), and Gabriel (1937). This operation has certain advantages and my object is to suggest that it should be adopted more often in the treatment of rectal cancer.

It is common practice to speak of cancer of the terminal sigmoid as a pelvi-rectal growth, and it is not possible to make a sharp distinction between some high growths of the rectum and those of the terminal sigmoid. In order to avoid confusion the term rectal cancer is used here to mean that the actual surface of the growth can be touched with the finger on rectal examination. I propose to limit my remarks to such cases, though it is obvious that a growth half an inch higher may require the same treatment.

No operation for cancer can be regarded as efficient if it does not aim at removing not only the growth but also the potentially involved lymphatics and glands. Of late years increasing attention has been paid to the lymphatic drainage of the rectum and its involvement by growth. It will be germane to consider some of the findings.

According to Miles the lymphatic drainage of the rectum takes place mainly in an upward direction along the superior hæmorrhoidal artery, but also laterally along the levatores ani muscles and downwards in the region of the ischio-rectal fossæ. In 1925, as the result of injections of the rectal lymphatics, Villemin, Huard and Montagné suggested that the rectum should be regarded as two parts, each having a different lymphatic drainage. The lower part, the ampullary portion and the ano-rectal region, drains upwards but also laterally and downwards, while the upper, that part of the rectum above the lowest valve of Houston, drains only in an upward direction along the superior hæmorrhoidal artery. From the dissection of specimens removed by perineo-abdominal resection, Gabriel, Dukes and Bussey (1935) considered that the spread of rectal cancer took place first into the regional lymph-nodes in the close vicinity of the growth and then in an upward direction along the superior hæmorrhoidal artery, lateral and downward spread only taking place when the lymphatics above were blocked by growth.

Recently the same view has been taken by Gilchrist and David (1938). Out of 47 specimens removed by abdomino-perineal resection they found 2 in which, as the result of metastases above the growth, a retrograde spread to lymphatic glands below the growth had occurred. They found evidence, however, to suggest that a lateral spread in the region of the levator ani muscle was more frequent when the growth was at that level. Present belief seems to be that the main lymphatic spread of any rectal growth

* Communicated to the Royal Society of Medicine, section of proctology, on May 10.

is in an upward direction. While a low growth may also spread laterally and downwards it is uncommon for a high growth to do so unless there is already extensive lymphatic involvement.

THE OPERATION

The operation of abdominal resection, which is only suitable for a growth in the upper part of the rectum, aims at the removal of the growth, its lymphatic drainage up to the aortic bifurcation, and some two inches of healthy bowel and mesorectum below it.

It follows the usual lines of the abdomino-perineal. The inferior mesenteric artery is ligatured and the peritoneum divided on either side of the rectum and in the pouch of Douglas. The rectum is stripped forward from the sacrum, separated anteriorly from the vagina or the prostate and vesicles, and the lateral ligaments divided. The rectum takes a somewhat curved course in its normal position, and, provided it has been properly freed, if it is now pulled upwards and forwards a growth which lay well below the sacral promontory may now lie almost in the abdominal wound. With the bowel in this position the mesorectum on the posterior surface of the rectum is divided cautiously with long curved scissors as low as possible in the pelvis and at least two inches below the growth. It is essential that the rectum should be properly freed before this is done, since otherwise a considerable part of the mesorectum may be left behind in the sacro-coccygeal region. There is no need to apply clamps before the division since there is little bleeding.

Some flavine gauze is now packed into the pelvis and the rectum is drawn up and divided between clamps as low as possible. The ampullary portion of the rectum is bulky and the clamps must be strong. After trying a number of clamps I have come to the conclusion that the best is a Peyr's clamp, applied from before backwards and downwards, the handle over the pubes and not from side to side. The distal stump is closed and invaginated.

Drainage of the pelvis is probably wise in every case. In the female it can be carried out through the posterior vaginal wall; in the male through the abdominal wound. It may also be carried out through the ischio-rectal fossa; though favoured by position, this is uncomfortable for the patient. The pelvic peritoneum is now united over the rectal stump, the sigmoid divided at the desired site and a left iliac colostomy performed.

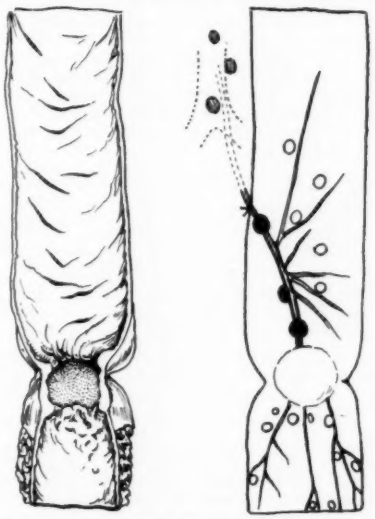
It is perhaps unnecessary to point out that the final decision as to whether a growth is suitable for abdominal resection can only be made when the abdomen is opened, and the surgeon must therefore be prepared to perform the abdomino-perineal operation should this be indicated.

DISCUSSION

Rankin (1929) described a series of 26 cases in which he performed this operation with 1 death, for which no adequate explanation could be found at autopsy. I first used this operation for a rectal carcinoma some two years ago and I have now performed it on nine occasions. I am convinced that it is a valuable operation for certain cases of rectal cancer.

Since the greater part of the operation is essentially that of the abdomino-perineal it cannot be claimed that it is easier or quicker to perform, but it is certainly attended with far less shock than a "combined" operation (abdomino-perineal or perineo-abdominal). It is almost bloodless and there is no need to alter the position of the patient. The patients' postoperative course is smoother; they can be more easily nursed; there is no perineal wound to dress; and they can move about as easily in bed as a patient after any other abdominal operation.

Infection of the pelvic tissues from the rectal stump is a possible complication, and in a mild degree is probably common. Rankin describes a case in which an abscess formed and was drained through the rectal stump. A similar complication occurred in one of my cases and was treated in the same manner. Blood and mucus may collect in the rectal stump and cause the patient discomfort. For this a catheter may be passed, or a drainage-tube may be stitched into the anus at the time of operation.



Specimen of carcinoma of the upper third of the rectum removed by abdominal resection. The diagram on the right represents the mesorectum after dissection, and illustrates the penetration by the growth and the position and involvement of the lymphatic glands.
Open circles: glands sectioned and found free from growth.
Shaded circles: glands believed to contain growth.
Black circles: glands sectioned and found to contain growth.

A few inches of rectum are left. Though unlikely, it is possible that another growth might start in this part. One of my patients, with a growth in the upper part of the rectum, had some large piles excised two months before I saw her. Three months after abdominal resection a small nodule was excised from one of the hæmorrhoidectomy scars in the peri-anal skin and was found to be a nodule of adenocarcinoma of the rectum. An implantation from the rectal carcinoma had undoubtedly taken place on one of the raw areas at the time of the hæmorrhoidectomy.

There is here no suggestion that this operation is quite as good as a "combined" operation. It does not remove the levatores ani, nor their associated lymphatics, nor the fat in the ischio-rectal fossæ, and small glands in the lowest part of the mesorectum might be left behind in the sacro-coccygeal region. It does, however, remove the main lymphatic drainage of the rectum to the highest possible point. It is intended for the high rectal growth and here the lymphatic drainage is upwards, a retrograde spread only taking place when the glands above are extensively invaded by growth.

The specimen shown in the figure is a rectum excised by abdominal resection, and has been taken

as an example since it was one of the more advanced cases in the series.

The patient, a man of 67, had a somewhat adherent growth in the upper part of the rectum, with a history of two years. At laparotomy enlarged hard glands were present along the aorta and there was a small secondary in the liver. The growth was excised by abdominal resection and the specimen carefully dissected to show the lymphatic glands, all of which were sectioned. The growth had surrounded the lumen of the rectum and spread deeply, forming a mass of growth an inch in diameter in the mesorectum. Ten lymphatic glands were removed from the mesorectum below this level and none of these contained growth, though some of them were taken immediately below the point at which the growth had spread into the mesorectum. Above the growth only those glands in the direct line of the inferior mesenteric vessels contained metastases; those along the sigmoid were free.

INDICATIONS FOR ABDOMINAL RESECTION

(1) The growth must be in the upper third of the rectum. Since some 60 per cent. of rectal growths start in this site there is no need to suppose that this operation must have a very limited field.

(2) The early high growth. This is the case in which an abdomino-anal operation with restoration of continuity might be considered if the essential anatomical provisions were present. An abdominal resection would give an efficient removal in such a case and should be the operation of choice if the patient was a "doubtful risk" for a combined operation.

(3) Carcinoma of the upper third of the rectum in a patient unfit for a combined operation by reason of age, general condition, or an advanced and adherent growth. It is here that I believe the operation to be particularly valuable in that its use will raise the operability-rate of rectal cancer. It may be argued that no attempt should be made to remove an advanced and adherent growth. This is a matter of opinion; adhesions may be inflammatory and palpable glands are often free from growth. I do not consider that involvement of the bladder, or of one ureter, or even a small secondary deposit in the liver, should necessarily contra-indicate the removal of the primary growth.

RESULTS

A plea for this operation is that by its use more cases of rectal cancer can be submitted to excision.

Total cases of rectal carcinoma		40
Refused surgical intervention though operable	1	
Considered inoperable; palliative colostomy	5	
Submitted to surgical excision	34	
Operability-rate (34 out of 39)	87·1 %	
Total combined operations		18
Perineo-abdominal (3 deaths)	14	
Perineo-abdominal and Wertheim	1	
Abdomino-perineal	3	
Total deaths, 3. Mortality, 16·6 per cent.		
Total perineal resections		7
(1) Low growth, poor physique.		
(2) Palliative resection for hæmorrhage. (Death.)		
(3) Obese, myocardial degeneration, low growth.		
(4) Low growth.		
(5) Low growth. Age 80.		
(6) Auricular fibrillation.		
(7) Paget's disease. Age 68.		
Total deaths, 1. Mortality, 14·2 per cent.		
Total abdominal resections		9
(1) High growth, poor subject. Age 71.		
(2) High growth, obese.		
(3) High growth, frail. Age 66.		
(4) Early high growth.		
(5) High adherent growth.		
(6) High adherent growth.		
(7) High adherent growth, resection of portion of bladder wall and right ureter.		
(8) High adherent growth, small secondary in liver.		
(9) Early high growth.		
Deaths, 0.		

Short series of cases are to be deprecated, since the information they provide may be misleading. Yet if I am to attempt to substantiate this claim I can only do so by giving a brief summary of those cases of rectal cancer which have been under my care since I first used this operation some two years ago. During this period I have had 40 cases.

Mortality of abdominal resection.—Rankin had a mortality of approximately 4 per cent. Though there have been no deaths in this short series I have recently had a fatality after a somewhat similar operation for a carcinoma of the sigmoid loop involving the bladder. I believe, however, that the mortality of this operation is low, probably in the region of 5 per cent., even on a poor subject.

Summary of results.—Out of 34 cases, 53 per cent. have been submitted to either the perineo-abdominal or the abdomino-perineal operation, 26 per cent. to abdominal resection and 21 per cent. to perineal resection. Excluding the patient refusing treatment, 87 per cent. of all cases seen have had excision with a mortality of 11·7 per cent.; or 76·4 per cent. of all cases seen have had their growths excised and have survived the operation.

Prognosis of abdominal resection.—This series is too small and insufficient time has elapsed to make any definite statement as regards the ultimate prognosis. One case has succumbed to another disease and was believed free from recurrence at death; another (the case quoted) had an implantation carcinoma in a hæmorrhoidectomy scar, but is otherwise believed free from recurrence 18 months after operation. A third patient had a small secondary in the liver at the time of operation. The other six patients are alive and believed free from recurrence, but the longest time that has elapsed since operation is only 2 years and 4 months. From a pathological standpoint, provided this operation is applied to a high rectal growth, I see no reason why there should be much difference between its ultimate prognosis and that of a combined operation.

CONCLUSIONS

Miles's conception of the amount of tissue that should be extirpated to ensure the most efficient operation for rectal cancer has more supporters now than at any time. Whether this be performed by the operation which he originally described or the alternative perineo-abdominal route seems an almost immaterial point which may be left to individual taste. Apart from surgical skill and careful pre- and post-operative treatment, the selection of cases must remain a major factor in the mortality of these operations. While it is probable that this is in process of reduction, unless the selection is confined to those in good health, of whom there are few with rectal cancer, it is unlikely that the mortality of such a surgical exercise can be below some 10–15 per cent.

Abdomino-anal operations are occasionally possible. This attempt to restore the continuity of the bowel requires a high and early growth and the anatomical provisions of a mobile sigmoid with a good blood-supply. Since suitable cases are not common, the operation of choice for rectal cancer must remain the abdomino-perineal or perineo-abdominal.

However enthusiastic the surgeon, from time to time he will find patients upon whom, by reason of age or infirmity, he will hesitate to perform this operation. Fortune may smile on hazardous proceedings, but let us not invoke her aid too often if other measures are available. Mummery's operation of perineal resection has given many

cures in rectal cancer, and if the growth is in the lower third or ampullary portion of the rectum it should certainly be removed by this method if the patient is unsuitable for a combined operation.

Unfortunately the upper third of the rectum is a common site for carcinoma. Age, obesity, a large and adherent growth, or simply the fact that the growth is at this site, may lead the surgeon to a palliative colostomy. This may prevent obstruction and prolong life, but it does not rid the patient of the frequent call to stool and the passage of blood and mucus. Radium and deep X rays are powerless in this matter and should rightly be eschewed as half-hearted measures save in the most obviously inoperable growth. Death from recurrence after surgery is far happier. If surgery can do anything to reduce the number of these unfortunates, sentenced to death with such a troublesome and prolonged finale, it should surely do so. It is here that I believe that abdominal resection of a high rectal growth, provided that it is efficiently performed, may offer to the patient an operation with less shock, an easier convalescence, a lower mortality, and an ultimate prognosis which, since the *main* lymphatic field is removed to exactly the same extent, can be but little lower than that for a combined operation.

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SPECIFIC GRAVITY OF THE BLOOD IN PNEUMONIA

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IN the circulatory failure of a large variety of diseases concentration of the blood plays an important part. The immediate cause may be great disparity between the gain and loss of water or deviation within the body of fluid from the circulating plasma. The conditions with which hæmoconcentration may be associated have been reviewed by Marriott (1923) and others and more recently by Mandelbaum (1936).

A relationship between the severity of the infection and concentration of the blood was noted by Underhill and Ringer (1920) in patients suffering from influenza. In 43 serious cases of influenza hæmoconcentration was present in the 28 who died but not in the others. The authors suggested that this hæmoconcentration was caused by the dilatation of the capillaries in the lungs and by the subsequent pulmonary œdema which was a prominent feature of the fatal cases. Underhill (1920) also described hæmoconcentration after the inhalation of phosgene as due to the same mechanism.

A similar relationship was observed in patients suffering from cholera, when the intake of fluid was not sufficient to balance the greatly increased loss from the bowel. Rogers (1921) found that during the acute stage of cholera of moderate severity there was an average loss of 52 per cent. of the fluid of the blood, and in fatal cases 64 per cent. This was calculated by measuring the proportions of serum and corpuscles. Rogers concluded that the degree of dehydration could be assessed accurately enough for clinical purposes by estimating the specific gravity of the blood. In nearly all of the cases of cholera observed by him the specific gravity of the blood was raised from the normal figure, for Indians, of about 1·054 to between 1·060 and 1·068. Most commonly the figure was about 1·063–1·065.

We therefore estimated the specific gravity of the blood daily, as far as possible, and at about the same hour, in 54 consecutive cases of acute lobar pneumonia (42 men and 12 women).

NORMAL SPECIFIC GRAVITY OF BLOOD

The average specific gravity of the blood for healthy men was found by Schmaltz (1891) to be 1·059 and by Bamberger (1892) 1·0575. Leake, Kohl, and Stebbins (1927) report an average figure of 1·0568. Polowe (1927), using the same method (Barbour and Hamilton 1926), obtained almost identical results and remarked that the figures were 0·002 higher in the morning than at other times. The specific gravity of the blood is said to be three or four degrees lower in women than in men. There is less agreement about the limits within which the specific gravity of the blood may normally vary. Peiper, quoted by Sahli (1911), considered the normal limits to be 1·045–1·066, but it seems to us that this wide variation is unlikely in health.

TECHNIQUE

We removed 2 c.cm. of blood from a vein at the elbow and placed it in a dry test-tube containing a known amount of oxalate, measured by evaporating to dryness, at a low temperature, 0·4 c.cm. of a solution of ammonium oxalate 0·6 g. and potassium oxalate 0·4 g. in 100 c.cm. of water. The specific gravity of the oxalated blood was then determined by Hammerschlag's modification of Lloyd-Jones's method, as follows.

A mixture of benzol and chloroform of specific gravity between 1·050 and 1·060 is placed in a dry test-tube or cylinder. A drop of blood is allowed to fall gently into the mixture, and, according to whether it sinks or floats, chloroform or benzol is added until the drop is exactly suspended in the middle of the column of fluid. The specific gravity of the mixture is then determined with an ordinary urine-testing hydrometer and is approximately the same as that of the drop of blood. The latter should not be too large, otherwise it will break up; and care must be taken that it is not surrounded by an envelope of minute air-bubbles. Such a drop should be ignored and another added. After filtering, the mixture of benzol and chloroform may be retained for further use.

The method described by Lloyd-Jones, and used by Rogers, is essentially similar to the above, except that, instead of the benzol and chloroform mixture, separate solutions of glycerin and water of different specific gravities are substituted.

RESULTS

Table I gives the results of estimating the specific gravity of the blood in a small number of normal or convalescent patients, estimated in our laboratory by this technique. It will be noticed that these figures are more constant from day to day than those of our patients with pneumonia shown in table II.

Table II shows the specific gravity of the blood during the acute stage of the illness in 54 consecutive cases of acute lobar pneumonia. These have been described as "mild," "average," or "severe," according to the impression formed by one of us (J. J. E.) on clinical grounds.

In table III the cases of pneumonia are grouped according to the highest specific gravity of the blood recorded during the acute stage of the illness.

Only one patient recovered with a specific gravity of the blood over 1·062. His case-record is as follows:—

CASE 41.—A man, aged 34, had shivering and pain in the left chest of sudden onset while he was at work on May 20, 1938; May 21: admitted to hospital in a fair condition, very breathless, but not cyanosed, with profuse sweating, no labial herpes, occasional painful cough with purulent sputum containing type I pneumococci (Neufeld reaction), temperature 102° F., pulse-rate 106, respiration-rate 28, signs of consolidation at the left base, and a blood-pressure of 158/94; May 22: general condition much worse, with pallor, cyanosis, and sweating, pulse-rate 130, respiration-rate 36, profuse growth of type I pneumococci in 24 hours on blood-culture, and specific gravity of the blood 1·063, but improved considerably after treatment with antipneumococcal serum (Lederle's), type I, 120,000 units given intravenously; May 23: general condition improved, specific gravity of the blood 1·061, and further 40,000 units of serum given; May 24: further improvement, specific gravity of the blood 1·062; May 25: specific gravity of the blood 1·055, improvement being maintained, temperature falling by lysis to normal on May 28, and patient recovering.

The only other serum-treated cases in the series were the two described below.

CASE 43.—A man, aged 36, was admitted to hospital on May 28, 1938, complaining of pain in the left chest of two days' duration, general condition being fairly good, with profuse sweating, dyspnœa but

TABLE I—SPECIFIC GRAVITY OF BLOOD IN NORMAL OR CONVALESCENT PATIENTS

Case	Age	1st day	2nd day	3rd day	4th day
55	73	1·058	1·059	1·059	1·059
56	69	1·058	1·057	1·057	1·057
57	71	1·055	1·057	1·056	1·057
58	66	1·056	1·059	1·058	1·059
59*	60	1·052	1·049	1·050	1·050
60	53	1·054	1·054	1·054	1·055
61	43	1·055	1·057	1·055	1·055
62	53	1·052	1·052	1·052	1·052
63	64	1·057	1·058	1·060	1·057
64	40	1·059	1·059	1·059	1·059

* Gastric ulcer. Hæmoglobin 60 per cent.

no cyanosis, infrequent cough with rusty sputum, signs of consolidation of the left base, pulse-rate 110, respiration-rate 28, temperature 102° F., blood-pressure 130/80, and specific gravity of the blood 1·060; May 29: general condition slightly improved, specific gravity of the blood 1·060, and blood-culture yielding type I pneumococci after 24 hours; May 30: general condition bad, patient being toxic, dyspnœic, and cyanosed, with specific gravity of the blood 1·057, type I antipneumococcal serum 80,000 units and 60,000 units being given; May 31: condition considerably improved, with specific gravity of the blood 1·055; June 1: improvement maintained, with specific gravity of the blood 1·057; June 2: specific gravity of the blood 1·054, temperature fell to normal by lysis, and patient recovered.

CASE 29.—A man, aged 39, was admitted to hospital on March 28, 1938, complaining of pain in both sides of the chest throughout the previous day, there being pallor, sweating, dyspnœa but no cyanosis, signs of consolidation at the right base, temperature

TABLE II—SPECIFIC GRAVITY OF BLOOD IN ACUTE LOBAR PNEUMONIA

Case	Sex and age	Day of disease									Remarks
		2	3	4	5	6	7	8	9	10	
1	M 53	..	..	..	..	..	..	..	..	66	Died on 12th day
2	M 58	..	..	..	62	64	63	..	..	..	Died on 8th day
3	M 53	..	..	..	..	..	..	57	58	..	Died on 10th day
4	M 36	..	..	60	62	50	54	57	54	..	Severe illness
5	M 25	..	..	..	..	..	51	55	56	59	Average severity
6	F 60	..	..	55	53	54	..	..	..	..	Average
7	M 44	..	..	57	57	..	..	..	..	..	Average
8	M 36	..	..	..	63	60	..	..	..	..	Died on 7th day
9	M 42	..	..	..	56	55	53	58	..	..	Average
10	M 48	..	..	..	59	59	60	57	..	..	Severe illness
11	M 51	..	59	..	..	..	..	..	..	..	Died on 4th day
12	M 15	..	..	58	59	60	..	..	..	..	Mild illness
13	M 50	..	55	59	58	55	56	56	..	..	Average
14	M 33	..	..	..	57	57	57	..	..	..	Average
15	F 42	..	59	58	55	..	..	..	..	..	Average
16	F 25	..	..	59	55	55	..	..	..	..	Average
17	M 47	..	..	..	..	57	59	58	59	..	Average
18	M 31	..	..	..	..	59	57	56	54	58	Average
19	M 56	..	..	..	..	..	55	50	..	..	Died on 9th day
20	M 69	..	..	..	..	64	59	..	..	..	Died on 8th day
21	M 35	..	62	58	56	54	..	..	..	..	Average
22	M 59	..	63	60	..	..	..	..	..	..	Died on 5th day
23	M 34	..	..	57	57	58	..	57	56	..	Average
24	M 51	..	..	59	58	..	..	..	..	..	Died on 6th day
25	M 38	..	..	..	62	62	..	..	..	..	Average
26	M 27	..	..	..	..	55	56	55	..	..	Average severity
27	M 42	..	..	57	..	..	..	..	..	..	Died on 5th day
28	M 52	53	53	52	52	51	52	52	..	..	Average
29	M 39	59	57	60	58	..	..	..	..	..	Died on 5th day
30	M 21	..	59	57	..	57	58	57	..	..	Average
31	M 35	60	55	52	58	59	..	..	..	..	Average
32	M 36	..	..	..	57	60	..	..	59	58	Died on 11th day
33	M 21	..	..	..	57	..	..	..	..	..	Died on 6th day
34	M 33	..	..	58	57	..	..	..	..	..	Mild illness
35	F 43	..	56	51	57	54	..	..	..	..	Average
36	F 33	..	..	..	57	52	..	..	..	..	Mild
37	M 42	..	..	..	59	57	..	..	..	..	Mild
38	M 40	..	..	..	..	54	53	56	58	58	Average
39	M 38	..	..	..	..	54	52	57	53	..	Average
40	M 14	..	..	..	..	..	57	52	56	..	Average
41	M 34	..	63	61	62	55	..	..	..	..	Severe illness
42	M 18	..	..	..	..	53	..	..	..	..	Mild
43	M 36	..	60	60	57	55	57	54	..	..	Severe
44	M 35	61	60	55	57	62	..	..	..	..	Severe illness
45	F 10	..	..	..	..	55	53	..	..	..	Mild
46	F 63	..	..	..	..	55	53	..	..	..	Average
47	F 44	..	..	..	..	..	..	58	54	..	Average
48	F 57	..	..	..	..	55	52	51	52	..	Mild
49	F 66	..	..	..	..	56	60	62	59	..	Severe illness
50	F 66	..	..	..	57	60	..	..	..	..	Died on 6th day
51	M 16	..	..	..	56	57	56	56	..	..	Average
52	M 52	..	..	..	..	..	..	..	56	57	Died on 10th day
53	F 51	..	..	..	..	..	61	..	..	..	Died on 7th day
54	M 36	..	..	..	57	58	57	..	..	..	Average severity

The above figures are the third and fourth decimal points—e.g., 53 = 1·053.

103° F., pulse-rate 120, respiration-rate 40, and specific gravity of the blood 1·059; March 29: patient worse, very toxic, with cyanosis of nail beds, blood-pressure 94/68, pulse-rate 120–130, specific gravity of the blood 1·057, and sputum containing type I pneumococci, and was given antipneumococcal serum 60,000 units; March 30: no improvement, pulse-rate 130, respiration-rate 40–48, specific gravity of the blood 1·060, 190,000 units serum given; March 31: specific gravity of the blood 1·058, progressive deterioration, and death.

COMMENT

Since fewer estimations of the specific gravity of the blood were possible in some cases than in others, the highest figure recorded for each patient is regarded as the most satisfactory common denominator. Consideration of the highest figure for each patient in relation to the severity of the illness shows that the specific gravity of the blood was above 1·059 in only 4 (12 per cent.) of the 32 mild and average cases, whereas figures over 1·059 were recorded at some period of the acute illness in 15 (68 per cent.) of the 22 severe and fatal cases. Among the fatal cases the highest recorded specific gravity of the blood was under 1·060 almost as often as not. Of the 14 patients whose highest figure was 1·060–1·062 only

4 died, but 9 were seriously ill. Of the 6 patients with figures of 1·063 or over, 5 died—a mortality of over 80 per cent. compared with 30 per cent. for the whole series, and under 25 per cent. for the patients with a specific gravity of the blood of below 1·063. Thus the severity of the illness was apparently related to the specific gravity of the blood.

An obvious explanation is the occurrence of dehydration, some degree of which is probably not uncommon. Often there is difficulty in giving even a normal amount of fluid by mouth to patients with pneumonia. Unfortunately, accurate measurement of the fluid output is usually impracticable because of the difficulty of periodically weighing sick patients. It seems likely, however, that in the presence of simple dehydration severe enough to affect the specific gravity of the blood the urinary output would be more diminished than was found to be the case in this series.

Another aspect of pneumonia to be taken into account is the condition of the peripheral vessels. In the work of Perry (1934) and of Greene (1937) there is evidence that the capillaries are abnormal. They are less able to remain contracted against distending pressures when affected by the toxins of the pneumococcus. Peripheral circulatory failure in pneumonia and in other infections has been attributed

TABLE III—RELATION BETWEEN SPECIFIC GRAVITY OF BLOOD AND SEVERITY OF PNEUMONIA

Specific gravity	Severity of disease				Group mortality (per cent.)
	Mild	Average	Severe	Fatal	
1·053–1·056	42, 45, 48	6, 26, 28, 46	..	19	
	(3)	(4)	(Nil)	(1)	12·5
1·057–1·059	34, 36, 37	5, 7, 9, 13, 14, 15, 16, 17, 18, 23, 30, 35, 38, 39, 40, 47, 51, 54	..	3, 11, 24, 27, 33, 52	
	(3)	(18)	(Nil)	(6)	22
1·060–1·062	12	21, 25, 31	4, 10, 43, 44, 49	29, 32, 50, 53	
	(1)	(3)	(5)	(4)	30·7
1·063–1·066	..	..	41	1, 2, 8, 20, 22	
	(Nil)	(Nil)	(1)	(5)	83

The numbers in this table refer to the case numbers as recorded in table II.

to dilatation of the capillaries, with increase in the permeability of their walls (Ritchie 1931). This factor too may affect the specific gravity of the blood.

SUMMARY

(1) The specific gravity of the blood was estimated daily during the acute stage of acute lobar pneumonia in 54 consecutive cases.

(2) The specific gravity of the blood tends to rise with the severity of the illness.

(3) A high mortality was associated with a specific gravity over 1·062.

We are indebted to Dr. E. C. Hadley for permission to publish this paper.

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PNEUMOCOCCAL MENINGITIS

REPORT ON FIVE CONSECUTIVE CASES TREATED WITH SULPHANILAMIDE-PYRIDINE (M. & B. 693)

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FORMERLY HOUSE-PHYSICIAN AT THE HOSPITAL

IN recording a case of pneumococcal meningitis treated with sulphanilamide-pyridine (M. & B. 693) McAlpine and Thomas (1939) said they could trace reports of only 3 similar cases published in this country. We think it may be of interest therefore to give an account of 5 consecutive cases treated in the past six months at St. James' Hospital.

CASE 1.—A man of 28 was admitted on Oct. 27, 1938, having been ill for six days with delirium; he had previously recovered from a heavy cold. He was very ill. The temperature was 101·2° F., the pulse-rate 96, and the respirations 28. On examination of the lung there was a poor percussion note at the right base. Cerebration was slow, the neck was rigid and Kernig's sign was positive. The urine contained albumin + +, and lumbar puncture produced a heavily clouded fluid forming a clotted sediment on standing. Immediate examination (R. C. M.) revealed polymorphs in very large numbers and gram-negative diplococci, mostly intracellular. A diagnosis of meningococcal meningitis was made and sulphanilamide was given (Prontosil album 1 g. four-hourly).

Next day he was somewhat better; there was slight cyanosis but chest was clear. Temp., 100° F.; pulse, 92; resp., 24. Twenty-four hours after starting sulphanilamide a laboratory report on the cerebrospinal fluid (C.S.F.) stated that it contained 5000 white cells per c.mm.; smear shows many cocci, some gram-positive, but many "degenerated gram-negative forms. On culture, pneumococci, group IV." In view of this report the patient was put on M. & B. 693 (1 g. six-hourly by mouth). In the two following days he improved. On Oct. 30 the temperature was settling and the dose was reduced to 0·5 g. t.d.s.; he was now quite cyanosed but not dyspnœic. On the 31st he was afebrile and mentally normal though Kernig's sign was slightly positive. The C.S.F. on Nov. 1 contained "some polymorphs, no organisms, no growth. M. &. B. 693 1·55 mg. per 100 c.cm." Chemotherapy was stopped, and the C.S.F. remained sterile, the patient being discharged recovered on Dec. 1. The total dose over six days was sulphanilamide 6 g. and M. & B. 693 12 g.

CASE 2.—A man aged 59 was admitted on Jan. 7, 1939, with a history of five days' vomiting, and partial loss of consciousness on the day of admission. For over twenty years he had had deafness and a discharge from the ear, with attacks of vomiting lasting 6–8 hours, every few weeks. Temp., 97·4° F.; pulse, 102; resp., 24. Semiconscious with appearance of cerebral irritation. Neck rigid; Kernig's sign strongly positive; pupils equal and reacted to light; plantar responses flexor; knee-jerks present and equal; ankle-jerks absent. Mr. T. B Layton reported that the "ears show evidence of chronic disease; the meningitis is probably not secondary to active

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ear disease." The C.S.F. was turbid and immediate examination of it (by a clinician) showed 5400 white cells per c.mm.; on a stained smear there were gram-positive diplococci and polymorphs. A diagnosis of pneumococcal meningitis was made (later confirmed by the growth of pneumococci from C.S.F.) and M. & B. 693 1 g. six-hourly was given by mouth. The patient, however, showed no improvement and died twenty-six hours after admission, having received 4 g. of M. & B. 693 in twenty-four hours. At autopsy it was found that all the sulci over the vertex of brain on both sides were filled with a thick green pus; at the base of the brain there was congestion but no exudate. The middle ears were normal, the lungs were œdematous and the liver showed peripheral lobular necrosis.

CASE 3.—A man of 30 was admitted on Feb. 13, having had a severe frontal headache and vomiting for three days. He was rather ill; temp., 101° F.; pulse, 92; resp., 24. Neck rigid; Kernig's sign positive; ears and chest normal. The C.S.F. was cloudy and treatment with M. & B. 693 was started at once (1 g. six-hourly). Next day a laboratory report on the C.S.F. stated that pneumococcus type III had been grown from it. By Feb. 20 the patient was clinically recovered and on the 23rd M. & B. 693 was discontinued. On the 26th, however, severe headache and fever recurred, and next day M. & B. 693 (1 g. t.d.s.) was again given. By March 6 the patient was better though he still had some headache. C.S.F. report: "colourless, turbid; 14,000 cells per c.mm. (lymphocytes 8 per cent., polymorphs 92 per cent.). Protein 200 mg. per 100 c.cm.; globulin ++. No organisms; no growth." M. & B. 693 was discontinued on the 9th; there was still some fever but no headache. He was afebrile on the 13th and discharged on April 6, having had 40 g. of M. & B. 693 in the first ten days and 30 g. between the fourteenth and twenty-fourth days of his illness.

CASE 4.—A woman of 53. She was admitted on Feb. 26 having been ill for two days, with headache, pain in the right ear and restlessness. For a few hours she had been semiconscious. Temp., 104° F.; pulse, 94; respirations, 24. Pupils unequal, inactive to light; knee and ankle-jerks absent; right plantar response extensor; no stiffness of neck; Kernig's sign negative. Ears (Dr. W. L. MacCormac): "left normal; right, bulging of posterior meatal wall, intact drum." Chest clear; blood-pressure, 200/100; urine, sp. gr. 1035, sugar and diacetic acid present. The C.S.F. proved to be turbid and treatment with M. & B. 693 was started at once (2 g. statim; 2 g. in four hours' time; and then 1 g. four-hourly). Next day the patient was still semicomatose; the skin was moist, the breath smelt of acetone, and the pupils were dilated and equal. Pneumococci had meanwhile been grown from the C.S.F. She died 42 hours after admission having had 11 g. of M. & B. 693 in forty hours.

At autopsy the sulci over the vertex were full of thick green pus and there was a considerable layer of pus over the pons and medulla. The right temporal bone was infiltrated with thick green pus from which pneumococci were grown. There was also some hypertrophy of the left ventricle of the heart; the lungs were congested, and minute yellow points of toxic necrosis were scattered throughout the liver. Kidneys normal.

CASE 5.—A boy aged 6 was admitted at 5 P.M. on March 8, having been well till that morning, when he appeared sleepy, complained of headache, vomited once and gradually became stuporose. On arrival at hospital he was very ill (temp., 101° F.; pulse, 104; resp. 26). He was stuporose, cried out weakly, and was restless, irritable, and incontinent of urine. Neck very rigid; Kernig's sign positive; plantar responses flexor; *tache cérébrale;* scaphoid abdomen; no rash; tongue heavily coated; pharynx, ears, and chest clear. The pressure of the C.S.F. was not obviously raised: 3 c.cm. of very cloudy fluid was removed slowly, without affecting the clinical condition. Immediate microscopy showed many pus cells and gram-positive lanceolate diplococci. M. & B. 693 (1 g.) was given by mouth at about 7.30 P.M., but the boy died suddenly at 10 P.M., five hours after admission and about fifteen hours from onset of the illness. At autopsy fourteen hours after death the meninges at base of brain showed a little haziness; those over the convexity of cerebral hemispheres were pale and dry with no exudate. The convolutions were swollen and the sulci obliterated; on section the brain was very pale; the ventricles were only slightly dilated. The middle ears were normal: the bronchi contained tenacious mucus and there was congestion of the right middle and lower and left lower lobes. Tuberculous (caseous) deposits were found in the mediastinal glands and the lymphatic tissues were generally prominent. The kidneys were congested and the liver œdematous. Culture of meninges from the base of the brain gave pneumococci; culture from the bronchi gave *Bacillus coli* and non-hæmolytic streptococci, but no pneumococci.

The fact that 2 of these 5 cases of pneumococcal meningitis treated with sulphanilamide-pyridine (M. & B. 693) recovered is in accord with the impression that this drug has greatly improved the prognosis in this disease.

Case 1 illustrates the fact that an immediate differential diagnosis between the various forms of purulent meningitis is not always easy. For this reason, and because—apart from its superiority in pneumococcal infections—M. & B. 693 is at least as effective as sulphanilamide against meningococcal, streptococcal, and staphylococcal infections (Whitby 1938), we decided to give it at once in all cases of suspected meningitis in which lumbar puncture revealed a cerebrospinal fluid which was cloudy or showed a pleocytosis with organisms present. In cases 2, 3, 4, and 5, therefore, M. & B. 693 was given from the start.

In the 3 fatal cases (Nos. 2, 4, and 5) death took place respectively, twenty-six, forty, and five hours after admission. In case 2 the patient was admitted semiconscious and received moderate though not heavy doses of the drug. In case 4 fairly high doses were given but there was no response. Only one dose was administered in case 5 and in this case the post-mortem picture was unusual in that the convolutions were swollen, compressed and pale, with no exudate.

We wish to thank Sir Frederick Menzies, medical officer of health for the county of London, and Dr. W. L. MacCormac, medical superintendent of St. James' Hospital, for permission to publish these cases; also Dr. A. P. Piggott, deputy medical superintendent of the hospital, for facilities and help in collecting these cases.

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A FATAL CASE OF PNEUMOCOCCAL MENINGITIS

TREATED WITH M. & B. 693

BY KENNETH MAY, M.D. Lond., M.R.C.P.
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A MALE, aged 2½ years, was admitted to St. George-in-the-East Hospital on Jan. 1, 1939. Apart from measles at 1½ years the previous history was negative. He had been ailing for a month but was "worse today."

The temperature was 97·6° F., the pulse-rate 140, and the respirations 40. The child, who was very ill, appeared small for his age (not weighed). There was cyanosis and laboured respiration with expiratory grunting. The chest showed restricted movement and dullness on the right side with tubular breath-sounds at the base. The left side of the chest was hyper-resonant. The heart was dilated with a "pleural" friction near the apex-beat. A clinical diagnosis of consolidation of the right lung and ? pericarditis was made. There was no radiographic examination. The child was nursed in an oxygen tent and given M. & B. 693 0·5 g., followed by 0·25 g. every four hours.

The patient was moderately happy in the tent. The colour improved and the respirations, although still rapid (36–64), became easier. He drank well. The temperature remained normal and on Jan. 4 recovery appeared possible. There was evening fever on the 4th and 5th and the morning temperature on the 6th was 103° F. The right chest was explored in two places with negative results. Later that day there was a generalised convulsion lasting two minutes. At this time 8·5 g. M. & B. 693 had been given. Restlessness now made nursing in the tent difficult and a second fit occurred at 11.30 P.M. The clinical picture of meningitis was obvious on the 7th. The cerebrospinal fluid (when 9·5 g. M. & B. 693 had been given) was opaquely turbid. Its analysis showed:—

Cells: 860 per c.mm.—Lymphocytes .. 64 per cent.
Polymorphs .. 29 per cent.
Endothelials .. 7 per cent.
Chlorides: 625 mg. per 100 c.cm.
Gram film: Masses of gram-positive diplococci.
Culture: Pneumococcus, type X.
M. & B. 693: 3·4 mg. per 100 c.cm.

The blood showed anæmia (hæmoglobin 52 per cent. Sahli) and leucocytosis (white cells 46,500 per c.mm., 96 per cent. polymorphs).

The classical pre-M. & B. 693 course followed. Lethargy, coma with relaxed sphincters and limb paralysis. Inability to swallow necessitated stomach feeding on the 8th, when the dose of M. & B. 693 was increased to 0·5 g. four-hourly. Death occurred on the 9th. Permission for post-mortem examination was withheld.

The main difference between this and recorded cases with recovery (Reid and Dyke 1938, Robertson 1938, Cunningham 1938, and McAlpine and Thomas 1939) is that here meningitis complicated a chest infection. Meningeal invasion presumably occurred five days after the first dose of M. & B. 693 when a concentration, sufficient for cure in McAlpine and Thomas's case, already existed in the cerebrospinal fluid. In none of the earlier cases was the drug given before the second day of clinical illness. Other differences are the age, the youngest previous case (Reid and Dyke) being 7 years, the cerebrospinal fluid concentration (Cunningham achieved 8·5 mg. per 100 c.cm.) and the fact that the child had severe pneumonia from which he had not yet recovered. In view of the efficacy of M. & B. 693 with equally young children receiving comparable doses for pneumonia, and the initial improvement in this child, it seems that previous medication may have made the fatal difference. This assumes a rapid acclimatisation of the pneumococcus to M. & B. 693, experimental evidence for which was recently published (Maclean, Rogers and Fleming 1939).

Clinical confirmation that 693-fastness can be acquired would mean that the prognosis is hopeless when meningitis complicates a pneumococcal lesion treated with M. & B. 693. In that case it is to be hoped that the drug will reduce the incidence of a complication which is, happily, already rare.

I am indebted to Sir Frederick Menzies, medical officer of health for the county of London, for permission to publish this case.

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PNEUMOCOCCAL MENINGITIS

TREATED WITH M. & B. 693

BY P. S. RAMAN, L.M.S. Singapore
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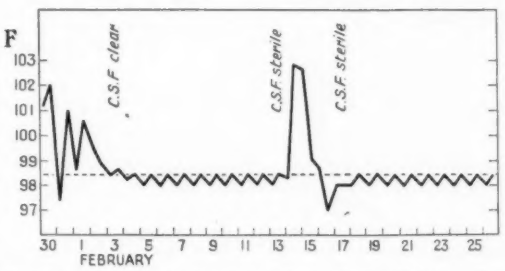
A RECORD of all the cases of pneumococcal meningitis at the General Hospital, Johore Bahru, during 1936–38 is as follows:—

1936: seven admissions and seven deaths.
1937: four admissions and four deaths.
1938: four admissions and four deaths.

Hence the following case may be of interest in more respects than one.

A male Tamil Hindu coolie, aged 34, was admitted on the morning of Jan. 30 with a history of fever with rigors for three days and unconsciousness for twelve hours. The pupils were semi-dilated and reacted sluggishly to light. Kernig's sign was positive.



Temperature chart showing relapse immediately after treatment with M. & B. 693 ceased on Feb. 13.

The temperature was 101·2° F., the pulse-rate 86, and the respirations 27. Lumbar puncture yielded a turbid fluid under pressure, showing 61 cells per c.cm., mostly polymorphonuclear. Direct smears stained with Gram and Ziehl-Neelsen revealed no organisms, but pneumococci (type not determined) were grown on culture. No primary focus of infection in the lungs, ears or sinuses could be found either on clinical examination or later by radiography.

Treatment and course.—Lumbar puncture was performed once daily, allowing the cerebrospinal fluid to drain as much as possible; it never became too thick to flow through a needle of ordinary size. M. & B. 693 2 g. was given soon after admission and then 1 g. three-hourly. The tablets were crushed in milk and administered through a nasal tube until the patient was able to take them by mouth. The temperature, as shown on the accompanying chart, reached normal on Feb. 2; from Feb. 1 the patient was sitting up in bed taking feeds by mouth and answering questions intelligently; from Feb. 4 he looked normal in every way; and on Feb. 13 culture of cerebrospinal fluid was sterile. From the 8th onwards the dosage of M. & B. 693 had been reduced to 1 g. three times a day, and the drug was withdrawn on the 13th.

Relapse.—Next morning the patient complained of very severe headache. The temperature was normal, and there was no rigidity of the neck, but a suspicious Kernig. By 2 P.M. the temperature had started to rise, with signs and symptoms of extreme meningeal irritation, and lumbar puncture yielded a very turbid fluid under tension. A direct smear, gram-stained, was crowded with pneumococci, and their presence was confirmed on culture. By evening the temperature had reached a maximum of 102·8° F., but with chemotherapy it fell promptly and from the following morning the patient had no further fever. Lumbar puncture and drainage continued, and on the 17th the fluid was again clear and sterile. The initial dose of M. & B. 693 during the relapse was 2 g. and it was followed by 1 g. three-hourly until Feb. 19, after which the quantity was reduced, the treatment being finally discontinued on the 27th.

According to the manufacturers the maximum dose of M. & B. 693 required in the treatment of pneumonia is 20 g. This patient with meningitis received a total of 80 g., but as soon as the drug was withdrawn he had a sharp relapse, appearing more severe than the original attack. The relapse was treated on the same lines and the control obtained was even more dramatic than before; the drug was withdrawn less abruptly and a total of 75 g. was given. The patient is taken to have been cured, and no sequelæ are evident. Nor were any ill effects from the drug detected.

It seems remarkable that in a cerebrospinal fluid rendered sterile by chemotherapy the pneumococcus should multiply in such enormous numbers as to produce symptoms within a day of withdrawal of the drug. As I have said, no focus of infection could be found elsewhere.

I am indebted to Dr. J. M. A. Lowson, physician to the General Hospital, Johore, for his guidance and encouragement and to Dato Dr. G. H. Garlick, principal medical officer, Johore, for permission to publish the case.

DISPLACED RIBS

By W. A. Ball, M.B. Lond.

SURGEON TO PETWORTH COTTAGE HOSPITAL, SUSSEX

THE condition to be described is of interest because it is common in general practice and can be easily and quickly cured. The fact that many cases of so-called pleurodynia are really cases of a displaced, not a slipped, rib has not been described before so far as I know. One often comes across cases of ill-defined pain in the chest without physical signs of disease in the ribs, lungs, or heart. If one runs one's hand up the chest wall, one finds that one rib is more prominent than the others, that it is in a position which it would normally occupy if the chest were expanded excessively, and that the intercostal space below is increased in size. The pain runs round the chest wall in that intercostal space as far as the costovertebral junction, which is tender on deep palpation. This pain can be cured by manipulating the rib in the usual way. It is so definite that one or two patients have come to see me a second time with the ready-made diagnosis that they have put their rib out again.

Ætiology.—This displacement can take place at all ages after childhood and in both sexes and all types. My youngest patient was a child aged 14, and my oldest a woman of 60. One patient was a huntsman in good training, and another an old woman who wore wasp-waisted corsets and took hardly any exercise. There is always a history of injury or strain, and the patient usually says that he has strained himself by a slight, unaccustomed, or clumsy muscular effort. There is often but not always a rheumatic diathesis. This does not contraindicate manipulative treatment, although the condition will not clear up so quickly and the manipulation will increase the immediate pain.

Symptoms.—In some patients who complain of pain in the chest it is either localised in, or radiating along, an intercostal space, and there is pain or tenderness at the corresponding costovertebral joint. If one runs one's hand up the chest wall, one of the ribs will be found to protrude beyond the general line of the chest wall, and the pain is along the adjacent intercostal space, either above or below (usually below) the rib. This pain is accentuated by taking a deep breath, moving the shoulder, or twisting the body. In some cases it is a severe pain of the lumbago type, and in many cases it is enough to keep the patient awake. The rib is dislocated, or at least out of position on its costovertebral axis; it is an accentuation of the normal pail-handle movement of the ribs that takes place to a limited extent on inspiration. I have had the condition myself, and it can be described as a feeling of diffuse pain in an intercostal space, made worse by moving the shoulder or twisting the body.

CASE 1.—A huntsman, aged 30, was holding in a restive horse, when the horse suddenly jerked away. He felt a sudden severe pain in the region of the fifth rib, could not continue on the horse, and had to return home. When I saw him he was in much pain and suffering from shock, and the fifth rib was definitely out of position. Manipulation at once relieved the pain, and radiography the next day showed no bony injury.

CASE 2.—A country postmaster, aged 45, who was used to working as a painter from time to time, called me to see him because he had strained his chest. His pain was so severe that he had been unable to sleep even after taking aspirin. The physical signs were as described above, and after I had relieved him by manipulation he told me that he had had an attack previously, which I had forgotten, and which I had then cured by manipulation, and he had thought that I could cure him again by the same method of "stretching."

CASE 3.—The following account of a similar case is of interest because it was written by a dentist. I had manipulated him once before for a displacement of the fifth rib, which I had cured. He came to see me this time with a ready-made diagnosis of a similar condition. Since I was then writing this article, I asked him to write down a description of his symptoms and his own views on the case. The following is his account: "There was a violent fit of coughing in the middle of Friday night. On the Saturday morning a definite stiffness was felt between the shoulder-blades, and there was a sensitive spot about half-way down the sternum. There was not much discomfort; a golf-club could be swung without any discomfort, though there was a slight strain if the left hand was stretched round and above the right shoulder. There was, however, a definite feeling of stiffness across the back after lounging in an armchair for about an hour. I have no definite recollection of involving the left side in any unduly large strain. Possibly my working attitude with the right shoulder always held lower than the left might be a predisposing cause."

In this case the pain was not so acute as usual, and the rib involved was the third. Manipulation gave almost immediate relief.

Anatomy.—One usually looks upon the ribs as moving as a whole, but if they move as a whole each

separate rib must move. In each inspiration and expiration each rib moves about an axis which is directed somewhat downwards, passing through the costocentral articulation and the neck of the rib, and a little in front of the costotransverse joint. To effect this movement there must be a movement at the articulation of each rib. The articulations of the fifth rib, which we will consider throughout this description, with the vertebra are two: the costocentral, which unites the head of the rib with the bodies of the fourth and fifth vertebræ, and the costotransverse, which unites the tuberosity of the rib with the corresponding transverse process. At these articulations slight but distinct gliding movements take place. At the costocentral joint the movement must be rotatory, whereas at the costotransverse it is a gliding in the concavity of the transverse process. It seems that at one of these joints the articular surfaces get locked in a position of inspiration, and that opening up the joint spaces by manipulation enables the bones to spring back into the correct position. The muscles that are of special importance are the pectoralis minor, which arises from the upper and outer surface of the rib near the costal cartilage, and the serratus magnus or anterior, which arises from the outer surface of the rib. The digitation of the pectoralis minor goes obliquely upwards and outwards and will pull the rib into a position of excessive inspiration, whereas the serratus magnus goes obliquely backwards and downwards to the lower angle of the scapula and tends to correct this position when one is manipulating the body in the third manner or the second (see below).

Diagnosis is not very difficult, once the condition is recognised. Other causes of pain in this region must be excluded by the usual methods; but in the case of a displaced rib there is no local tenderness or swelling, and in the most obvious cases in which manipulation would do harm—i.e., a broken rib—there can be no excuse for failing to realise that the rib is unnaturally painful when the patient lies prone. When the rib is normal—as in any lung condition—no harm can be done by manipulation.

Treatment consists in manipulating the ribs as for reduction of ribs and for curing the vertebral pain in fixation of the costal vertebræ. The methods have been garnered from various sources. I usually perform as many of the manipulations as I can.

(1) The patient lies prone on the examination couch or floor in a relaxed position. The practitioner stands or kneels at the side and places the ball of each thumb on the costovertebral junction of the rib involved and on the corresponding rib of the other side. With the weight of the body and arms slightly bent, a forceful thrust is given downwards and outwards. Often the surfaces can be heard to separate with a click. This is repeated up and down the whole length of the ribs.

(2) The patient is then told to sit on a backless chair or on a chair that is turned sideways. On examination the eversion may be found to have disappeared. If not, the following manipulations should be carried out. The practitioner stands behind the patient, rests one foot on the chair, and places his knee on the affected costovertebral junction. He grasps the patient's hands in his from behind, his palms against the backs of the patient's hands. He inserts his elbows in front of the patient's elbows, and presses his knee upwards and forwards, while at the same time he presses backwards, downwards, and outwards with his hands and elbows rather in the manner of a man awaking from sleep. It is an interesting thought that perhaps the reason for this "awakening" stretching is an instinctive loosening of the ribs after lying down asleep.

(3) With the patient still on the chair, the practitioner, still standing behind with his knee against the patient's back, grasps the patient's elbows in his hands and pulls the elbows backwards against his knee.

After these manipulations the patient is usually free from pain and the protrusion cannot be felt. Otherwise the patient is told to return in about three days if there is still pain, because sometimes there is a rheumatic element, and there is a subsequent reaction.

SUMMARY

A condition of displacement of the rib that is common in general practice is described. It consists of an eversion of a rib in relation to the other ribs that is recognised by palpation and causes pleurodynia. It can be cured by manipulations that are described.

I am much indebted to Dr. J. B. Mennell, who taught me the second manipulation and made me realise the importance of manipulation in general practice.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF LARYNGOLOGY

AT a meeting of this section held on May 5 the chair was taken by Mr. C. A. SCOTT RIDOUT, the president, and a paper on

Complications of Intranasal Surgery

was read by Mr. WALTER HOWARTH. It was perhaps surprising, he said, that untoward results were not more frequent, in view of the anatomy of the area. A mere catalogue would be dull and depressing, and he would confine himself to points of interest and importance. Adequate anæsthesia was essential and, if it were to be local, cocainisation must be preceded by careful premedication, or severe syncope might occur at the onset. A dry field went far to minimise accidents. Mistaken diagnosis might cause complications. He had seen a hæmangioma of the ethmoid mistaken for inflammation and diphtheritic rhinitis operated on for adenoids. Influenza and other intercurrent disease might predispose to such complications as otitis media, sinusitis and tonsillitis. No operation should be performed on a patient with a septic condition of the skin. Perfection of technique was of the first importance, and details must be thought out most carefully; demonstration was far more instructive than reading. The surgeon should see an expert perform an operation before himself undertaking it. Errors arose from putting on to the intranasal route more than it could be expected to bear, and using it when an external operation was really needed. In order to reach that last ethmoid cell, the orbit or cranial cavity or cavernous sinus might be damaged. No two ethmoids were exactly alike. Limited and repeated intervention might prevent complications, but the tendency in this country was to succeed by one operation only if possible. No ethmoidal operation was free from risk. Sometimes the operation seemed satisfactory and yet the patient died of meningitis. A remarkably free exposure could be obtained by a very small external incision, and often the scar was invisible. The external operation, if more often used, would increase the safety of the patient. The anterior ethmoidal

cells could not be satisfactorily dealt with by the transantral route. The frontal sinus could usually be safely approached intranasally, but the sound must never be allowed to leave the ethmoid and approach the middle line where the cribriform plate was very thin. Rasps seemed to complicate the healing owing to exuberant granulations and the risk of scar-tissue formation. The intranasal operation on the maxillary antrum was very successful if a large opening were made below the intact inferior turbinate. There was no need to open up the anterior angle of the antrum. The nasal duct must be carefully avoided. Exploration of the antrum with trocar and cannula might cause blindness through damage to the optic nerve, but the curved trocar and cannula was a safe instrument. The inferior turbinates were important structures which should be treated with great consideration and all essential tissues should be conserved as far as possible. Many disastrous consequences followed untimely intervention during inflammation. Much could be done with cocaine packs and probes and antral puncture, while cutting operations might cause severe septic destruction. Traumatic conditions were often better left alone. Anything that prevented aeration and drainage was likely to be harmful, and plugging was therefore to be deprecated. Many cases bled freely and might need a light plug for a few hours, but it should always be removed the same day. Septal operations called for loose plugs in the lower part of the nose which could be removed in 24 hours.

Mr. E. D. D. DAVIS emphasised the need for delicacy and care in intranasal operations. A clear view was essential, with good illumination and free use of a suction pump. A blind operation was always undesirable. It was quite easy to leave a swab in the nose. Injuries which had occurred in spite of careful technique affected the orbit, optic nerve, lacrimal duct and cribriform plate and roof of ethmoid. He had collected 13 cases of perforation of the roof of the ethmoid. The bone was often made thin and brittle by polypi and suppuration. The most vulnerable point was punctured when working under cover of the middle turbinate; it was relatively difficult to pierce the actual cribriform plate. The posterior ethmoidal artery had a short intracranial course, and might cause severe hæmorrhage into the posterior fossa. If a perforation was known to have occurred, the patient should be kept sitting up and plugging must be avoided. The symptoms of perforation were collapse and shock with slow recovery from the anæsthetic, intolerable headache, drowsiness, escape of cerebrospinal fluid and blood in the lumbar-puncture fluid. Damage to the orbit caused proptosis and ecchymosis near the inner canthus. These cases did well if they were left alone and the eye were bandaged with a little pressure—but not enough to ulcerate the cornea. Orbital abscess must be opened; it caused fever, increased pain and œdema, and fixation of the eyeball. Five cases of injury to the optic nerve which were on record were all on the left side—as were also the orbital injuries, on account of the position of the operator. The danger lay in direction of the forceps outwards. There might be an abnormality of the optic nerve, bringing it exceptionally close to the ethmoidal cells. It was difficult to determine the exact injury; presumably it was crushed. Avulsion with Luc's forceps was more dangerous than cutting off the top of the turbinate with scissors and snaring. Curettage of the nose was dangerous and unsatisfactory: it often caused osteomyelitis. Optic atrophy had not followed orbital hæmorrhage. He had only seen two cases of injury to the nasolacrimal duct. In one young woman blood came into the eye whenever she blew her nose.

Mr. MUSGRAVE WOODMAN called attention to the danger of infection of the septum from the antrum, leading up to the cavernous sinus. The septum should never be touched when evacuating potentially infected sinuses around. The other danger he wished to point out was apical infection around an incisor in septal operations. The tooth might appear normal, or the infection be regarded as irrelevant. The canines did not seem to have the same connexion with the lymphatics of the septum. Another danger was that involved in washing out the ethmoidal sinus, which caused a number of accidents every year.

Mr. D. J. GUTHRIE suggested as a possible cause of accident the absence of adequate cleansing toilet before operation. The mucosa was not prepared as the skin would be, and pus was washed out immediately before opening an antrum. Antisepsis after interference might be useful. He agreed that direct injury into the cranial cavity occurred through the ethmoidal roof and not through the cribriform plate, which was very difficult to perforate. Meningitis was usually the result of sepsis rather than direct injury. Some thought that intranasal antrostomy should be performed near the normal opening; antrostomy in the middle meatus region was often followed by damage.

Mr. W. S. THACKER-NEVILLE thought there were not many accidents; the openers had had difficulty in collecting cases. Internal antrostomy was a most uncomfortable operation unless the tip of the inferior turbinate were cut off. Cutting did no harm, but the cautery destroyed cilia. Slight hæmorrhage into the orbit did not matter. The greatest danger was operating on acute cases and was now unnecessary. Short-wave diathermy had done away with the temptation, as it gave relief and often cured the patient altogether.

Mr. T. RITCHIE RODGER suggested absolute refusal to pack the nose after operation as a good way of avoiding accidents. He had not used packing for many years. Septal operations did not need it if the flap were replaced and Whitehead's varnish applied, and careful anæsthesia were combined with adrenaline.

Mr. HERBERT TILLEY described his own experience of cauterising the inferior turbinate, with subsequent quinsy. He had seen a case in which a cannula had been passed into a left suppurating frontal sinus and a little air had been injected. The patient had become hemiplegic for about ten minutes—presumably from air embolus. He agreed that it was a mistake to pack, except in submucous resection; after this he supported the slack mucosa for 24 hours by a pack of gauze inside a fingerstall.

Mr. T. B. JOBSON said he used packing with 10 per cent. Argyrol in simple antrostomies, and had had no trouble of any kind; the opening was undoubtedly better maintained thereby.

The PRESIDENT agreed on the great value of the external operation.

Mr. HOWARTH, in reply, said he did not think it necessary to cut off part of the inferior turbinate. He agreed that packing should be avoided in everything except the septal operation.—Mr. DAVIS, also in reply, said that hæmorrhage into the orbit was very distressing to the patient. He was sure the spoon was a mistake. He had abandoned Whitehead's varnish because of hæmatoma.

REVIEWS AND NOTICES OF BOOKS

Spinal Anesthesia

By LOUIS H. MAXSON, A.B., M.D., formerly chief anesthetist to Harborview Hospital, Seattle. London: J. B. Lippincott Company. 1938. Pp. 409. 30*s*.

THIS book gives one of the most complete presentations of the principles and practice of spinal anæsthesia that we have yet seen in the English language. Only two methods are omitted and these are perhaps not strictly within the scope of spinal anæsthesia: injection into the sacral hiatus and paravertebral and parasacral injection. The book starts, after a historical survey, with a careful and well-illustrated account of the anatomy of all the structures concerned in spinal analgesia—the vertebral column, the cord and its coverings, the cerebrospinal fluid and so forth. In this chapter there is a special warning of the effect that spinal injection may have on the accelerator nerves of the heart, an effect which is often overlooked when high spinal block is under discussion. The physical aspects of the method are discussed in detail, with their bearing on the different techniques recommended by various authorities. It is made plain that many conceptions, such as that of rapid mass movement of spinal fluid for example, are faulty, and that dispersion, convection and diffusion, in which gravity plays its part, are alone responsible for the shifting of the anæsthetic from the point of injection to other points in the spinal canal. By dispersion the author means mechanical mixing from the force of the injection or from the churning action within the spinal canal. The proper value of experimental work on animals whose spinal content of fluid is much less than that of man and of glass-tube experiments is assessed in this chapter. Dr. Maxson seems to regard absorption into the circulation as negligible unless large doses are used and spread over a considerable surface of nerve tissue, and this is in accord with general experience. Coming to the actual practice of spinal injection he gives details of a number of techniques, pointing out their various merits and disadvantages and giving his own preference. For abdominal anæsthesia the patient is placed on his back directly after injection; if the anæsthesia is required beyond the umbilicus the table is placed at a 10° Trendelenburg angle, being levelled again when anæsthesia reaches the desired height. For perineal anæsthesia the patient is kept sitting for four minutes after injection.

A discussion of the effects of anæsthesia, technical difficulties, total and segmental anæsthesia and a number of other topics complete the book. It deserves the careful study of every anæsthetist who employs spinal methods, for its author has not only wide experience and admirable judgment but an open mind.

A Synopsis of Medicine

(7th ed.) By H. LETHEBY TIDY, D.M. Oxfd, F.R.C.P., extra physician to the King; consulting physician to St. Thomas's Hospital, London. Bristol: John Wright and Sons. 1939. Pp. 1187. 21*s*.

CLINICAL teachers are mostly prepared to agree that a summary is helpful for revision purposes and that one compiled by an experienced clinician may be more serviceable than the student's incomplete notebooks. The staccato style of this synopsis, which enables an amazing amount of information to be condensed into small space, is no bar to its usefulness for those with some medical background though it is difficult, and perhaps dangerous, for the student to assimilate facts in such concentrated form. To sum up in its well-known pattern one might say—

LETHEBY TIDY (*Baedeker of Medicine*)

USES.—Numerous: Popular with: (1) Practitioners—to refresh memory; (2) Teachers, especially medical registrars before ward rounds—to avoid omissions; (3) Candidates for higher exams such as M.R.C.P.—often as a Compulsion Neurosis; (4) Students—apt to be confusing.
FIRST WRITTEN.—1920. Six editions since, last in 1934.
RECENT ADDITIONS.—Many, especially: (1) Blood, rewritten, good; (2) Endocrines, as up to date as is safe. Sulphonamide in, M. & B. 693 not.
OMISSIONS.—Some, but few. Postural Drainage in treatment of Lung Abscess. Relation of same to Carcinoma of Bronchus. Chronic Constrictive Pericarditis, as such.
TREATMENT.—Clear. Emphasis naturally difficult. Might adopt the star system of Baedeker with advantage. Index good. Charts, few but helpful, especially Acute Gomerular Nephritis.
GENERAL IMPRESSION.—Good, though a few authorities disagree.
PROGNOSIS.—Good.

Principles of Medical Statistics

(2nd ed.) By A. BRADFORD HILL, D.Sc., Ph.D., reader in epidemiology and vital statistics in the University of London at the London School of Hygiene and Tropical Medicine. London: *The Lancet*. 1939. Pp. 189. 6*s*.

THE call for a second edition of this book within two years is evidence of the skill with which the author has performed his difficult task—namely, the interpretation to the unmathematical of the principles involved in a type of argument that must of necessity take a numerical form. We note his approval of our definition of statistical method as "arithmetic guided by logic." His success has no doubt been due primarily to the fact that logic is given pride of place. The arithmetic is presented throughout as arithmetic in use, in which form it is less obnoxious to those whose ability to deal firmly with figures has decreased, slowly but surely, from the time they left school. Throughout the book we are presented, in words, with the kind of problem to which we are accustomed. Is a specific antipneumococcal serum effective in the treatment of lobar pneumonia; and, if so, is it equally effective at different ages? What is the effect on miners of the inhalation of anthracite dust? What are the results of different methods of treating cancer of the cervix, or pulmonary tuberculosis? Are the available methods of prophylactic immunisation likely to be effective in lessening the incidence of a particular infective disease? The arguments involved are then expanded, and given precision, by a consideration of the assumptions on which they are based. If an estimate of the value of antipneumococcal serum is being based on the recorded fatality-rates in groups of treated and untreated cases, we are assuming—and it is often a very unsafe assumption—that the two groups are alike in every relevant respect except that serum was or was not given. If we are trying to assess the relative value of different methods of treating carcinoma of the cervix, say, by operation or radium, by comparing the records of two hospitals, or clinics, we are assuming (among other things) that the criteria adopted for classifying the cases, when first seen, into different orders of severity are identical in the two groups; and experience

suggests that they are often different. When an argument of this kind has been given its logical development in words, Bradford Hill shows us how to put it into the more convenient numerical form, and how to record our data in ways that make it easy to frame numerical statements that are unambiguous. There are chapters on the more important statistical methods that provide the investigator with a convenient mathematical shorthand for stating his conclusions and the limitations to which they are subject. He is shown, simply and clearly, how to calculate a standard error, or a correlation coefficient, and how to handle the χ^2 test. In the present edition Dr. Hill has added a chapter on the methods of calculating standardised death-rates, and has illustrated by further examples a few points which had been found to cause difficulty to some readers.

Recent Advances in Chemotherapy

(2nd ed.) By G. M. FINDLAY, C.B.E., M.D., D.Sc. Edin., Wellcome Bureau of Scientific Research. London: J. and A. Churchill. 1939. Pp. 523. 21*s*.

THIS book gives a masterly summary of the advances that have been made in the subject during the last decade. It deals with practically all aspects and the various chapters cover the chemotherapy of helminthic infections, amœbiasis, leishmaniasis, malaria, trypanosomiasis, syphilis, tuberculosis, leprosy, acute bacterial infections, and virus infections. Reference to any particular branch of chemotherapy is facilitated by the division of the chapters into numerous subsections, each being followed by its own list of appropriate references.

Since the previous edition appeared in 1930 one of the most important and striking developments in medicine has been the introduction of the sulphanilamide compounds. How widespread has been research in this subject may be judged by the fact that the section dealing with the chemotherapy of the acute bacterial infections occupies five times as many pages as in the previous edition. The chapter on the therapy of trypanosomiasis has also undergone expansion and reorganisation in view of the great amount of work that has been done during the past ten years in this disease on the mechanism of action of drugs and the problems of drug-resistance. Similarly, important developments in synthetic antimalarial drugs, notably the introduction of Atebrin, have produced much new material for the chapter on the chemotherapy of malaria. Increases in these and other sections have been compensated for by elimination of much of the older material in the original edition. In fact so great has been the pace of chemotherapeutic research that the present edition provides what is essentially a new book. The few errors it contains, as for example that in the structural formula of Plasmoquine, are but typographical slips.

The book will be not only indispensable to workers in chemotherapy, but of the greatest value to all practising physicians at home and abroad who wish to use these new chemotherapeutic weapons safely, intelligently, and honestly.

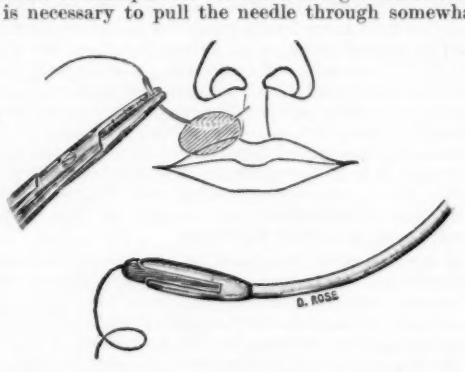
NEW INVENTIONS

RADON-SEED INTRODUCER

THE accepted technique for inserting radon seeds in the treatment of surface lesions, such as cavernous nævi and rodent ulcers, leaves much to be desired. The various pointed trocars and "guns" in use all make a puncture much larger than the seed, which is thrust through their lumen into the puncture hole. The puncture may bleed annoyingly, especially in those extremely vascular nævi for which the method is admirably suited. The seed, too, is but loosely retained in the puncture, and may come out prematurely, even while the others are being inserted. Accurate placing of the seeds is difficult; and, finally, unnecessarily ugly scars are left by the punctures.

The radon-seed needles shown in the diagram have been designed to overcome these disadvantages. There are two forms: the round-bodied for use in vascular lesions, especially in children, where the skin is thin; and the triangular pointed for use where the skin is thick or tough. The seed is held at the after end of the needle, just as the gut is held in a Souttar's intestinal needle; but loosely, so that it may be separated by a slight tug on its thread. The needle is used in an ordinary holder, and is passed under or through the lesion as shown. When the seed has entered the tissue and reached the required position, it is released by holding its thread firmly while the needle completes its journey. The relatively small gauge of the needles ensures that bleeding is minimal; and the needle may actually traverse even very vascular tumours without troublesome bleeding. The seed remains securely in place, though it comes out sufficiently easily when deliberately pulled.

These needles are the outcome of several experimental patterns made for me by Mr. Donald Rose, of 36, George Street, Portman Square, W.1, and tried out on many cases during the last two years. Straight needles were also tried, but proved much more difficult to manipulate. When treating small lesions, it is necessary to pull the needle through somewhat



gently, with a careful twisting movement. If pulled forcibly it may suddenly come through, bringing the seed right out at the point of exit. The trick is, however, soon acquired, and the technique presents no other difficulties.

The needles are made to take a seed of 1·1 mm. external diameter, which allows for a screenage of 0·3 mm. of platinum. The standard length of the seeds used is 6 mm., and at least 2 millicuries of radon can be inserted into each if required, though my custom has been to work with 0·75 to 1·0 millicurie. Seeds up to 1 cm. long can be used with the same needles if desired.

E. STANLEY LEE, M.S. Lond., F.R.C.S.
Assistant surgeon to Westminster Hospital.

THE LANCET

LONDON: SATURDAY, MAY 13, 1939

WERNICKE'S ENCEPHALOPATHY AND VITAMIN B_1

MOST morbid anatomists will remember examining a subject who has died with symptoms and signs pointing to an encephalitis whose nature has eluded clinical analysis. Although encephalitis lethargica is now almost extinct, the clinical diagnosis is still occasionally made in such cases, possibly for lack of a more suitable label. The post-mortem examination may fail to elucidate the precise cause of death: the brain is perhaps a little swollen and diffusely hyperæmic; other organs may show cloudy swelling; there may be chronic gastric disease or a chronic pyogenic infection. The tentative diagnosis remains "encephalitis" pending microscopical examination. But histologically there may be no frank evidence of encephalitis and the pathologist is on the horns of a dilemma. The brain is a bulky organ and he may have been unfortunate in his choice of blocks. On the other hand the clinical manifestations of brain disturbance may have been part of a toxæmia of undetermined origin with no selective effect on the brain cells. It is in these cases that the existence of Wernicke's encephalopathy should be remembered, and there is reason to believe that it is not infrequently missed at necropsies since the condition has been strangely ignored in this country. CAMPBELL and BIGGART[1] have collected no fewer than 12 cases in Edinburgh. Their description and analysis of this material provides not only a useful résumé of what is so far known about the condition but has led them to some interesting deductions concerning its pathogenesis.

The disease, otherwise known as acute superior hæmorrhagic polio-encephalitis, was described by WERNICKE as long ago as 1881 and has generally been ascribed to alcoholism. In only one of CAMPBELL and BIGGART'S series, however, was an alcoholic history obtained. In their cases the symptoms persisted for periods ranging from 3 days to 10 weeks, and included drowsiness, apathy and incoherence, sometimes with temporary excitement and hallucinations; oculomotor disturbances were the commonest objective feature. The pathological changes are mainly remarkable for their curiously restricted localisation. The corpora mamillaria are constantly and may be solely affected, but symmetrical lesions have also been found in the hypothalamus, the medial parts of the thalamus, the peri-aqueductal grey matter, the colliculi, and the floor of the fourth ventricle. These lesions, usually visible to the naked eye as areas of congestion with or without hæmorrhages, are characterised microscopically by vascular proliferation accompanied by a variable amount of glial proliferation and an absence of inflammatory infiltration. The nerve-cells are remarkably free from injury.

The pathogenesis of this rather specific disease of the brain is by no means settled and has been much disputed. It is closely related to Korsakoff's syndrome, with which it has, clinically, much in common, and has thus been attributed to chronic alcoholism. Many cases are however on record where alcohol could not be incriminated, and hence it has been plausibly argued that the encephalopathy is due to an endogenous toxin. In analysing the available evidence CAMPBELL and BIGGART find no very convincing support for either of these views or for the theory that anæmia is responsible. They point out the predominance of gastro-intestinal disease both in their own series and in cases reported elsewhere. Pregnancy, especially when complicated by hyperemesis gravidarum, is also an associated condition and is known also to be complicated at times with Korsakoff's syndrome. This association has recently been stressed by H. L. SHEEHAN (*Proc. R. Soc. Med.* 1939, **32**, 584). All of these conditions, including chronic alcoholism, may be associated with polyneuritis, and this, we now know, can often be traced to a deficiency of vitamin B_1. It is therefore at least likely that Wernicke's encephalopathy is also due to a similar deficiency. Experimental support for this view was provided in 1934 by PRICKETT,[2] who produced foci of congestion, hæmorrhage and parenchymatous degeneration with the formation of compound granular corpuscles in the pons, medulla and cerebellum in rats by feeding them on a diet deficient in B_1. Moreover, last year ALEXANDER, PIJOAN and MYERSON[3] produced hæmorrhagic lesions in the basal ganglia and brain-stem of pigeons in the same way. Against this argument, however, is the absence of Wernicke's encephalopathy in beriberi. Thus the operation of several agents may be required, but, as CAMPBELL and BIGGART suggest, a deficiency of vitamin B_1 seems to be the most likely common factor.

1. Campbell, A. C. P., and Biggart, J. H., *J. Path. Bact.* 1939, **48**, 245.

PROGRESS AGAINST PNEUMOCOCCI

WHEN the capacity of sulphanilamide for controlling hæmolytic streptococcal infections was found to extend even to meningitis, the last vestiges of scepticism about the new remedy gave place to astonishment and conviction. With the advent of M. & B. 693 last year it was at once recognised that a precisely parallel test awaited this drug; for pneumococcal meningitis is almost always fatal, and its cure would be an unequivocal achievement. Success of this kind has now been reported in a number of cases,[4] and more are added by three papers in our present issue. These communications have the merit of

2. Prickett, C. O., *Amer. J. Physiol.* 1934, **107**, 459.
3. Alexander, L., Pijoan, M., and Myerson, A., *Trans. Amer. neurol. Ass.* 1938 (in the press).
4. See for example: H. E. Robinson, *Med. J. Aust.* March 18, 1939, p. 433; M. Cutts et al. *J. Amer. med. Ass.* April 15, 1939, p. 1456; A. P. Yule, *Brit. med. J.* April 29, 1939, p. 872.

presenting both sides of the picture, for of the total of 7 cases described only 3 recovered. It is notorious and only natural that unexpected success gains more publicity than expected failure, and the 5 cases with 2 recoveries reported by Dr. MACKEITH and Dr. OPPENHEIMER probably give a truer picture of what is to be anticipated from this treatment than may be gained from enthusiastic accounts of single cases. Dr. KENNETH MAY suggests that the failure he reports may be attributable to the pneumococcus becoming resistant to the drug; which would mean that the treatment of meningitis complicating pneumonia which has already been treated with M. & B. 693 is likely to be hopeless. There are certainly features in some case-records consistent with bacterial escape from chemical control after several days of comparative suppression; but Dr. RAMAN'S case encourages one to hope that such relapses are not beyond control, perhaps by massive doses. Whether bacterial drug-resistance is the true explanation of the failures cannot yet be known, but there is every reason to advise the most vigorous possible treatment in the first few days with the object of sterilising the meninges. In view of the incompleteness and variability with which the drug is absorbed from the alimentary tract the injection of its more soluble sodium salt might enable the attack to be launched with greater speed and vigour; but this remains to be seen.

We have referred more than once to the mixed reception M. & B. 693 has had in America; there have been elements in it not only of scepticism but of positive indignation at the incompleteness of the data that accompanied it across the Atlantic. But the proof of the pudding is in the eating, and there are further indications that "sulfapyridine," as it is officially called over there, has not belied its promise. Science Service reports[5] Dr. PERRIN H. LONG as saying that it has "cut the pneumonia death-rate at the Johns Hopkins Hospital by two-thirds." A. T. WILSON and collaborators[6] have made a careful study of its effect on pneumonia in children, and their conclusion, well founded statistically, is that it shortens the course of the disease by between three and four days. Another study of pneumonia with striking results is reported from Canada by GRAHAM, WARNER, DAUPHINEE and DICKSON.[7] It embraces three groups, each of 50 patients, severally receiving Dagenan (M. & B. 693), serum, and no specific treatment; the deaths in the three groups numbered 3, 6, and 12. Alternate cases of infection with pneumococcus types I, II, V, VII and VIII were given serum, but the drug-treated group includes infections by other types, and to that extent it is not strictly comparable. On the other hand it included the highest number of cases with bacteræmia—17 with only 3 deaths—whereas in the serum-treated group there were 7 such cases with 4 deaths and in the controls 11 with 5 deaths. This comparison of chemo- and sero-therapy, to the latter's disadvantage, is the first of its kind; but if it should seem to threaten the extinction of serum treatment for pneumonia, be it remembered that once the requirements of experimental study are satisfied, there will be no reason, apart from trouble and expense, why the two remedies should not be associated.

The authors of these two last papers confirm previous observations that the concentration of the drug attained in the blood is very variable. This was also observed by MEAKINS and HANSON[8] in a series of 30 cases of pneumonia which were treated with only 1 death. They suggest that these variations may be due to different degrees of conjugation of the drug, and the same idea is put forward by BRYCE and CLIMENKO,[9] who add both clinical and experimental observations to show that the extent of conjugation varies with the basal metabolic rate. All who have studied the subject seem to agree that optimum dosage has yet to be defined and that the behaviour of the drug in the body needs further investigation. As we have already pointed out, a method of administration more certain and rapid in its effect seems also to be needed in some cases, and the first two American authorities quoted here have in fact given the sodium salt intravenously in order either to secure a quicker action or to obviate nausea and vomiting. These are evidently directions in which the treatment may be improved and possible causes of failure defined.

INFECTIONS OF THE HAND

ON all sides one sees people with crippling deformities of the hands following infections simple in their origin; in some merely rigidity of the terminal joints, in others the loss of a finger or fingers, and in others a stiffening of the whole hand rendering it useless for all ordinary occupations. KANAVEL, a pioneer on this subject whose book has just reached a seventh (posthumous) edition,[10] quotes the records of the Industrial Accident Board of Oklahoma where of 60,600 partial disabilities 20 per cent. and of 900 complete disabilities 58 per cent. were due to injuries and infections of the hand. It is not stated what proportion of these disabilities was caused by infections as distinct from injuries. The figure seems to vary between 20 and 75 per cent. according to the type of work, but differentiation is complicated by the fact that practically every infection starts as an injury, and most injuries become infected. As an illustration of what can be done in the way of prevention, it is worth noting that precautions taken for the removal of broken baskets and exposed ends of wire reduced the number of infections from this source from 75 to 10 in one year. Arrangements for the immediate treatment of all injuries by a competent surgeon and for the early hospitalisation

5. *Science*, April 7, 1939 (suppl. p. 10).
6. Wilson, A. T., Spreen, A. H., Cooper, M. L., Stevenson, F. E., Cullen, G. E., and Mitchell, A. G., *J. Amer. med. Ass.* April 15, 1939, p. 1435.
7. Graham, D., Warner, W. P., Dauphinee, J. A., and Dickson, R. C., *Canad. med. Ass. J.* April, 1939, p. 325.
8. Meakins, J. C., and Hanson, F. R., *Ibid*, p. 333.
9. Bryce, D. A., and Climenko, D. R., *J. Amer. med. Ass.* March 25, 1939, p. 1182.
10. Infections of the Hand. (7th ed.) By Allen B. Kanavel, M.D., Sc.D., late professor of surgery, Northwestern Medical School, Chicago. London: Baillière, Tindall and Cox. 1939. Pp. 503. 30*s*.

of cases where infection later develops are prophylactic measures that should be taken by all responsible for the welfare of workmen.

For the proper understanding and treatment of established infections anatomical study is essential, and this is the basis of KANAVEL'S classic work. He shows how readily the bone of the terminal phalanx may necrose if pressure has caused thrombosis of the artery of supply, and this is one of the commonest events in pulp injuries. He explains the route of spread up the finger and into the palm via the lumbrical canals, and the anatomical location of the potential spaces in the palm. These spaces are situated deeply in the hand, behind the long flexor tendons and in front of the interosseous muscles and the adductor of the thumb. The middle palmar space lies between the middle metacarpal and the hypothenar muscles and is liable to infection from a lesion in the three medial fingers, while the thenar space lies between the middle metacarpal and the muscles of the thenar eminence, and is liable to infection from a lesion in the index finger or thumb. SPALDING [11] has carried out dissections and examined cross-sections of the hand, and his work confirms the existence of these two spaces. The septum between them is in his view produced by a special thickening of the fascia along the radial side of the second lumbrical muscle, which he calls the intermediate septum of the hand. It runs from the palmar aponeurosis in front to the fascia covering the adductor muscle of the thumb, thus gaining indirect attachment to the third metacarpal bone. Apart from these two main spaces there are others between the muscles of the thenar eminence, and between the muscles of the hypothenar eminence, but these are of less importance as sites of secondary infection as they are definitely separated from the rest of the palmar structures. BRICKEL,[12] in a new work on hand and forearm infections, agrees with KANAVEL on the main issues, but differs in his division of the palmar spaces. He also has made injections of opaque material into different parts of the hand and fingers, but as the pressure used is not stated the two sets of experiments may not be comparable. Nor is it certain that injections under pressure will necessarily follow the same course or be limited by the same structures as inflammatory exudations. BRICKEL finds that his injections into the ulnar bursa (the expanded portion of the sheath of the flexor of the little finger) are apt to rupture into the palm, filling the whole palmar concavity, and to extend as far as the first lumbrical muscle, on the radial side of the index. The thenar space of KANAVEL he believes to be nothing more than a dissection of the fascia from the surface of the adductor of the thumb, limited by its attachments. These minor differences of opinion on anatomy are perhaps not of great importance to surgeons, but they serve to remind us of the fact that pus can find its way into the palm, where its early recognition may be of crucial importance to the individual patient.

Tendon-sheath infections are probably responsible for more permanent stiffness than any other class of infection. KANAVEL still advises a long incision along the lateral aspect of the digit, without stressing the dangers of prolapse and necrosis of the tendon, or of its adherence to the scar should it survive. It is some years since ISELIN [13] pointed out that excellent drainage can be obtained in the three middle fingers by opening the sheath freely at its proximal end in the palm, with short incisions on each side of the digit opposite the flexion creases, thus preserving the stronger parts of the fibrous sheath, and preventing prolapse of the tendon. In the thumb and little finger incisions have to be made above the wrist and in the palm, but long incisions on the digit are better avoided. ISELIN'S incisions give good functional results, and are worthy of more general trial.

Of the other common infections of the hand, those spreading diffusely and rapidly along lymphatics form an important group. All authorities are now agreed that incision is dangerous in this type of infection, but it is sometimes difficult to recognise when it is better to be conservative. The effects of sulphanilamide in reducing the danger to life have not yet been properly assessed. The responsibility of the practitioner is not ended when he has made his incision, or decided that an incision is not to be made. The restoration of function should be his main concern. Complete immobilisation should last only a few days, and even during this time the straight splint should not be used. Active movements must be started as soon as the acute toxæmia is relieved, and later physical and occupational therapy of various kinds and psychotherapy should be carefully planned with the idea of enabling a man to return fully fit to his previous employment.

11. Spalding, J. E., *Guy's Hosp. Rep.* 1938, **88**, 432.
12. Surgical Treatment of Hand and Forearm Infections. By A. C. J. Brickel, A.B., M.D., from the departments of anatomy and surgery, Western Reserve University. London: Henry Kimpton. 1939. Pp. 300. 31*s.* 6*d.*
13. Iselin, M., Chirurgie de la main, Paris, 1933.

"... I can only repeat what I said on another occasion—'I do not believe that as a nation we cannot afford to be healthy.' At any rate, if it is finance, and finance only, that stands in the way, then let us be told so, and we can abandon the tedious process of flogging a dead horse by continuing to prove self-evident facts, and devote ourselves to the economic aspects. Most of us are not economists, but we could learn enough not to be crushed by mere shibboleths. For my part I should want to know whether the existing economic system in this country was for the benefit of the many or the few. . . . I should want to know whether it was really necessary that there should be such a large disparity between the cost of production of some of the so-called protective foods and the cost to the purchaser—why, for example, it should cost about three times as much to convey a cauliflower from Teddington to a poor woman in Tottenham as it did to produce it. I should want to know whether it would not be possible to make such substances as cod-liver oil available for poor people generally at something like the price at which they can obtain it in hospital. When I knew all these things I should know whether the approach of the millenium of health was being retarded by vested interests, or whether one must continue to sigh for it only as an impossible ideal."—Sir NORMAN BENNETT, *Public Health*, May, 1939, p. 231.

ANNOTATIONS

PREVENTIVE MATERNITY WORK

LAST November the General Medical Council, in pursuance of its statutory injunction to regulate medical qualifications, resolved that throughout the whole period of study the attention of the student should be directed by his teachers (*a*) to the importance of the measures by which normal health may be assessed and maintained, and (*b*) to the principles and practice of the prevention of disease. In pleading for a wider outlook in the teaching of obstetrics, Dr. Fairbairn points out [1] that there is no subject which can so well afford opportunities for educating students in prevention as maternity and child welfare. Hospital services, he says, are reserved almost wholly for the sick and injured, so that the attention of the medical student is inevitably focused on curative rather than preventive practice. But midwifery, with its pre- and post-maternity clinics, comprises the early links of the chain of services aiming at betterment of the health and physique of the rising generation. Dr. Fairbairn explains that he is not criticising the teaching given in obstetrics and gynæcology as such, but he finds some shortcoming on the part of teachers to bring home to their students the public-health, constructive, sociological and educational aspects of this branch of medicine.

The teaching of midwifery has always lagged behind the other parts of the medical curriculum. Qualification in midwifery was not made obligatory for admission to the register until 27 years after the introduction of medical registration, and it took almost another quarter of a century to implement the part of the act requiring it. Recommendations of the General Medical Council as to attendance on labour were ignored, and the student fitted in his maternity cases at his own convenience. A step forward was taken in 1907, when the council adopted the report of the John Williams Committee which recommended, amongst other things, that clinical training in midwifery should not be begun until attendance at lectures and service as medical clerk and surgical dresser had been completed. The Maternity and Child Welfare Act (1918) laid on local health authorities the duty of providing maternity services, and a revision of the obligations placed on teachers by the council, issued in 1922, recommended instruction on antenatal conditions and infant hygiene, and continuous attendance on obstetrical hospital practice for three months. The most recent revision, which came into force last November, was influenced to a considerable extent by the interim report (1930) of the Departmental Committee on Maternal Mortality and Morbidity. Under the new regulations six months' whole time must be devoted by the medical student to hospital practice in midwifery, infant hygiene and gynæcology, two-thirds of the time being allotted to midwifery (including antenatal care and infant hygiene) and one-third to gynæcology. Further, it is laid down that throughout the six months the student should receive practical training in antenatal and postnatal care, management of the puerperium and care of the infant. Clearly such a scheme, Dr. Fairbairn remarks, should be a consecutive lesson from pregnancy through labour and lying-in to the follow-up of mother and infant, with its continuity and singleness maintained into gynæcology. He urges the obstetric teacher to maintain an atmosphere so highly charged with the principles of constructive physiology that those principles shall become second nature to the student working in the department for six months. The opportunity should also be taken to make the most of the educational and social side of antenatal supervision. Antenatal clinics attached to maternity hospitals are apt to consider prematernity care from the pathological side, looking out for actual or potential disorders. Clinics run by public-health authorities with experience of baby clinics are more inclined to emphasise the physiological and hygienic aspect. Each, says Dr. Fairbairn, has much to learn from the other, but as yet contact between the two has scarcely begun. The patient should have a complete service, including not only obstetrical and medical antenatal supervision but also mothercraft and social services including visits when necessary. Students should see antenatal care in its fullness, and where hospital provision is incomplete arrangements should be made for attendance at a public clinic. The student is to become a family physician, and he should acquire the habit of studying each expectant mother as an individual, from the social as well as the medical standpoint.

The importance of educational and sociological work has been recognised by the Central Midwives Board in its new system of training for the midwives, who share responsibility for the care of maternity in this country. The various forms of maternity service available have hitherto been working with little liaison between them: a salaried domiciliary service should at least tend to unification. For years the Ministry of Health has been giving attention to all aspects of obstetrical care. Besides the more comprehensive training of students and midwives, the mothers themselves are being educated about the maternal functions, housing and social conditions have been improved, analgesics have been more widely used and antenatal work has been done on a large scale. The reward has begun to be reaped. The maternal death-rate for 1938 was 2·9 per 1000 live births, as compared with 4·4 in 1934, and England now stands second only to France (with a maternal death-rate of 2·3) among European countries.

1. Fairbairn, J. S., *J. Obstet. Gynæc.* April, 1939, p. 201.

POSTOPERATIVE PULMONARY COMPLICATIONS

THE contributors to a round-table conference [1] on postoperative pulmonary complications held in New York, each of whom approached the problem from a different point of view, illustrated well the diversity of opinion as to cause and prevention. Holman stressed three contributory factors—hypovitaminosis, exposure to respiratory infection in the immediate preoperative period, and over-sedation after operation. Cutler attributed pulmonary complications to embolism—the different forms depending on the size and infectivity of the embolus and variations in immunity. Beck discussed the factor of hypoventilation and retention of bronchial secretions. Statements that all postoperative pulmonary complications are due to embolism or atelectasis contribute little to the solution of the problem, in fact they merely put it in a different form, since we do not know how to prevent either of these accidents. The remedies proposed for prevention are numerous and vary according to which factors are regarded as

1. Holman, E., Cutler, E. C., and Beck, C. S., *Surg. Gynec. Obstet.* April, 1939, p. 335 (Internat. abstract. Surg.).

important. Most of these remedies are unnatural and many of them necessitate disturbance and discomfort to the patient. To apply them all to one patient would be both barbarous and dangerous. Yet if they are all of value why should not all be used? Surely the time has come to call a halt to these meddlesome therapeutics. If operation or anæsthetic is the cause of pulmonary complications we should modify not the patient but the procedure which we inflict on him. If after operation we harry him with frequent changes of posture, breathing exercises, CO_2 inhalations, injections of blood and saline, anticoagulants, antispasmodics, sympathetico-mimetics and what not, what chance is there for nature to use the one remedy that she has proved of value. That remedy is rest, and no surgeon has yet invented anything better.

UNIOVULAR TWINS OF DIFFERENT SEX

AN unusual case reported by Guldberg [1] shows how complicated are the theoretical possibilities in congenital malformations, and how difficult it is to decide between them. Here one twin was a girl who weighed 3000 g. at birth and has now developed into an attractive and perfectly normal child of 2½ years; the other was a female pseudohermaphrodite with a peniform organ canalised to the tip, who weighed 2650 g. at birth and died on the fifth day from atresia of the rectum and vagina and the absence of a functioning renal system. On the grounds of a single placenta and an anastomosis between the entering fœtal vessels, Guldberg takes for granted that the twins were uniovular and that separation took place relatively late. In addition, the two babies were so alike at birth as to be indistinguishable when clothed. According to modern ideas anastomosis of the fœtal circulations is indisputable evidence of monozygotism, and Guldberg does not discuss the possibility that binovular twins in a homozygotic population may be genetically so alike that there may be secondary fusion, as happens in freemartins. It is a pity that so careful a report includes no comparison of the capillaries and fingerprints.

The two usual explanations of intersexuality, a hormonal mechanism or a zygotic one, are both ruled out in this case. Macroscopically and microscopically the endocrine glands were normal, and the anastomosis between the circulations was so free that both twins can be presumed to have had an identical hormonal environment during their period of growth. A zygotic fault in the ordinary sense of the word is also impossible because of the normality of the surviving twin, who has been carefully examined. The conventional explanation of differences between uniovular twins is the unevenness of blood distribution which results from circulatory fusion; but in this case the similarity of the birth weights excludes any gross unevenness of distribution, and in addition this type of abnormality is not seen in twins where a definite circulatory difference can be proved to have existed. The possibility that a fault in the zygote only showed because of unfavourable intra-uterine conditions seems unlikely, because the twins were otherwise in excellent condition and the family history, which is known in detail for four generations on both sides, contains no record of any similar abnormality. Guldberg suggests that either the chromasomal material must have been unevenly divided, or that there must have been a mutation after division. He favours the latter hypothesis, and in the light of our scanty knowledge of the changes in intracellular metabolism accompanying differentiation, probably his view will go unquestioned.

1. Guldberg, E., *Acta path. microbiol. scand.* 1938. (Suppl.) 37, 197.

WAGES DURING SICKNESS

THE decision of the Court of Appeal that an employee, when absent from work through ill health, is entitled to be paid full wages in addition to sickness benefit was noted in these columns at the time.[1] In response to inquiries the Central Bureau of Hospital Information has circulated a valuable note on the legal consequences. In the absence of any agreement to the contrary, a sick employee is entitled to receive his wages until his contract of employment has been terminated by proper notice in the usual way. This right is not affected by the fact that he may also be receiving payments under the National Health Insurance Act. This being the legal position in the absence of agreement to the contrary, hospitals can, in engaging new employees in future, make clear what the rule is to be with regard to payment of wages during sickness. The bureau's note suggests a standard clause to be made a term of the contract of service. Naturally it is better to have the point set out on paper since the exact terms of a merely verbal agreement are so readily disputed. New staff taken on by a hospital (including domestic servants) would be asked to sign a note of the terms on which they are engaged. The suggested clause is as follows:—

"In case of sickness or accident the wages payable to an employee by the hospital shall be reduced by the amount of sickness benefit received by him under the National Health Insurance Act or the amount of compensation received under the Workmen's Compensation Act. After a period of three months' incapacity to work, the employment shall be taken to have been duly terminated unless the Board of Management otherwise directs."

The reference to Workmen's Compensation Act payments is an additional precaution. The Court of Appeal thought that the amount of wages which an employee can claim when absent from duty through sickness or injury must be reduced by the amount received by way of compensation under the statute. Workmen's compensation is in part based on the amount of wages, and the employee cannot both receive compensation for lost wages and have the wages in full as well. But, as the bureau's note points out, an employee may not claim compensation; and anyhow he is entitled, until he does claim it, to his full wages up to the date when his employment is terminated by notice in the usual way.

So much for staff engaged in future. With regard to existing staff two courses are open. Members of the staff who come within health insurance can be given formal notice to terminate their present contract of employment and can then be re-engaged on the new terms with an express provision limiting the right to pay during sickness. Or alternatively they can be invited to give up their existing right to full wages during sickness and to agree to some such condition as is set forth in the draft clause. This variation of their existing position would not be binding unless they received something which the law calls "consideration"—a *quid pro quo*. The bureau's note suggests a suitable *quid pro quo*. Ordinarily an employee engaged by the week can, if he falls sick, be dismissed at one week's notice, and so would not be entitled to more than one week's full wages in addition to his sick benefit. If it were

1. *Lancet*, March 18, 1939, p. 648.

agreed that the hospital would in those circumstances make up his sick benefit to full wages for four weeks instead of one, this would be such an improvement in his position as to constitute a reasonable and sufficient *quid pro quo*.

HISTOLOGICAL CHANGES IN EPILEPSY

EXTENSIVE work has been done on the action of convulsant drugs on animals in the hope of throwing light on the pathogenesis of epilepsy, but so far little note has been taken of the changes in the central nervous system produced by such convulsions. Opper,[1] working at the Yale University school of medicine, has induced convulsions in cats and rabbits by thujone (an isomeride of camphor) and monobromate of camphor. The animals received from three to ten injections each, the total duration of the experiments ranging from 1 to 94 days. Post-mortem examinations were made immediately after death; in some cases this followed shortly after the last convulsion, in others there was an interval of several days. Macroscopically there were no gross changes in the central nervous system. Microscopically the spinal cord showed no change, but in 23 out of 24 animals there were lesions in the brain, mostly confined to the cortex. The cornu ammonis and the cerebellum almost always escaped. This observation is in contrast to the findings in human epilepsy, and so far as it goes militates against the "vascular" conception of epilepsy, by which it is assumed that the cornu ammonis so often shows sclerosis because it is poorly vascularised. Opper suggests, however, that the cornu ammonis may be more generously supplied with blood in these animals. Possibly the local sclerosis is a manifestation of old-standing epilepsy, and could hardly be expected in animals which had only had convulsions for a few days. Cortical changes, which were rarely found in the occipital lobe, included areas of necrobiosis, sclerosis of the ganglion cells, petechial hæmorrhages and chromatolysis of nerve-cells. These changes can all be paralleled in human epilepsy. The fact that they were more marked in the animals which had had recent convulsions suggests that many of these acute changes are reversible, but the extent of the lesions bore no relation to the number or severity of the fits. Generally speaking the nature and site of the lesions were consistent with the occurrence of ischæmia during the convulsions, and therefore lend some support to the vascular theory of the origin of epileptic fits.

BLOOD CONCENTRATION IN PNEUMONIA

INCREASED concentration of the blood complicates many serious illnesses. It may be caused by excess of loss over intake of fluid, and this is often overlooked when the temperature is raised and the insensible loss from the skin and in the breath is greatly augmented. Or it may be due to escape of fluid from the circulation because of altered capillary permeability. The results are a fall in blood-volume and a rise in the red-cell count and in the viscosity and specific gravity of the blood. Under these circumstances the circulation is at a great disadvantage in performing its ordinary functions just when the patient is ill for other reasons. It is clear, therefore, that some watch should be kept on the blood concentration in cases of severe illness, and the simpler the method the more reliable will be the results. The blood changes most easily determined at the bedside are the hæmoglobin concentration, as an index of changes in the red-cell count, and the specific gravity. Using this latter method, Dr. J. J. Elphinstone and Dr. E. M. Ward have investigated 54 consecutive cases of lobar pneumonia, and they set out their highly significant results in this issue. They find that the mortality varies with the specific gravity; that the upper normal limit of 1·059 is seldom exceeded in mild cases, whereas patients with figures above 1·062 show a high mortality. It has not yet been ascertained whether the blood concentration in these cases is due to lowered fluid balance or to loss from damaged capillaries. But pending further information this work gives added point to ensuring an adequate fluid intake in pneumonia.

1. Opper, L., *Arch. Neurol. Psychiat., Chicago*, March, 1939, p. 459.

ARITHMETIC GUIDED BY LOGIC

THE great merit of Dr. Bradford Hill's book, of which the second edition is reviewed on another page, is its plea for a statistical sense rather than elaborate statistical methods. Some medical problems have no immediate relation to statistics—that is, to variable numbers—but others have. Ordinary medical practice would gain greatly if its practitioners were trained to weigh better the evidence on which they have to act. In general they are trained to appreciate clinical data only as they apply to individuals, while the correct assessment of many methods of diagnosis, prevention or treatment involves comparisons between groups. The first lesson to be learned is a healthy distrust of crude figures. A particular treatment has reduced the case-fatality of pneumonia by a third; Mr. X has had recurrent headaches for the last six months. Neither statement means much without further investigation. Of the two the latter is the more significant, since Mr. X's headaches probably mean something, while the observation about the pneumonia death-rate may not mean anything at all. Yet the medical practitioner, while he will certainly examine Mr. X, is quite likely to take the pneumonia figures on trust. He will be less likely to do so after he has read Dr. Hill's book; and that is a very good reason for reading it.

OPHTHALMOLOGISTS IN AUSTRALIA

IN Melbourne on April 19 Sir Frederick Mann, lieutenant-governor of Victoria, opened the first annual meeting of the Ophthalmological Society of Australasia (B.M.A.). The illness of the president, Sir James Barrett, unfortunately prevented his attendance, but Dr. James Flynn, the vice-president, read his address on blindness and the history of Braille type and took the chair. Among the representatives of kindred societies from overseas he welcomed Miss Ida Mann, who brought greetings from the Ophthalmological Society of the United Kingdom and from the ophthalmic section of the British Medical Association. Mr. Bruce Hamilton (Hobart) represented the ophthalmic section of the Royal Society of Medicine and Dr. R. G. Waddy (Sydney) the Egyptian Ophthalmological Society. Messages were also read from the United States (whose representative, Dr. Aaron Green, was delayed by the lateness of his ship) and from Japan.

The scientific proceedings opened with a lecture by Miss Mann on developmental abnormalities of the eye and their embryology. This was followed by a paper by Mr. Hamilton on birth injuries of the eye, showing that the obstetrician ought to know more than he does about the after-effects of ocular trauma. Dr. E. R. Trethewie then gave an account of the

influence of acetylcholine on ocular tissues. Next day Miss Mann read a further paper on ocular abnormalities, followed by Dr. J. H. Niall on persistent and progressive exophthalmos. This led to a discussion on orbital tumours in which Dr. Barham Black, Dr. Duncan, and Dr. G. A. Brew took part. Dr. A. L. Tostevin contributed a communication on recurrent bullous keratitis. The afternoon was devoted to histology and comparative anatomy, Dr. Rupert Willis and Dr. Kevin O'Day showing some beautiful preparations, Dr. O'Day's being especially interesting to visitors because they comprised many rare specimens of monotreme eyes never seen in the northern hemisphere. A visit was paid to the school and workshops of the Royal Victoria Institute for the Blind, and on the following day, after case-reports and cinematograph films, a remarkable series of demonstrations of operations was given by Dr. Aaron Green at the Royal Melbourne Hospital.

The society held a dinner at which Miss Ida Mann was elected the first honorary member and also a member of the Australian Committee for the Prevention of Blindness. It was suggested that the society should entertain an overseas guest at each of its congresses, and thus link itself with ophthalmologists in other parts of the Empire, to promote interchange of visits and ideas.

PSYCHOSOMATIC MEDICINE

"The medical profession has awakened to the necessity of studying what is commonly referred to as 'the art of medicine.'" With these words the editorial board of *Psychosomatic Medicine* justify the launching of their new journal.[1] To study the art, they say, means trying to understand "the psychic component in the disease process, and in the emotional relationship between physician and patient," and their journal is to be "devoted not to the isolated problems of the diseased mind or the diseased body, but to the inter-relationships between emotional life and bodily processes both normal and pathological." "It takes for granted that psychic and somatic phenomena take place in the same biological system and are probably two aspects of the same process, that psychological phenomena should be studied in their psychological causality with intrinsically psychological methods and physiological phenomena in their physical causality with the methods of physics and chemistry." In the interests of unity and of further progress it will endeavour to correlate what is being done in the special fields.

In an introductory article, entitled psychological aspects of medicine, Franz Alexander displays his capacity for discussing abstruse matters in simple terms. R. R. Grinker and W. R. Ingram follow with a paper on clinical and experimental work on the hypothalamus (embodying 480 references) which, like Alexander's, is a striking example of the contributions that modern neurophysiology has made to clinical problems. The bulk of this first issue of the journal however is formed by a symposium of eight articles on hypertension. The first of these deals with cardiovascular manifestations of an experimental neurosis in sheep, produced by the technique of "conflict" observed by Pavlov to produce "neurotic" disturbance of behaviour in the dog. Perhaps the most striking thing about this report is its emphasis that success in producing them under controlled conditions brings neuroses within reach of the great technical resources of experimental pathology. In the two subsequent papers L. N. Katz and Louis Leiter, cardiovascular internists, discuss the physiological and clinical background of present conceptions of essential hypertension, and Edward Weiss, also a general physician, reviews recent advances in the genesis and treatment of raised blood-pressure. The other communications record psychological studies in hypertensive patients who have undergone intensive deep psychological investigation; and the findings are summed up by Alexander in a paper on emotional factors in essential hypertension.

The new quarterly is sponsored by the American National Research Council, and, as its expensive format and low price perhaps suggest, it is a coöperative effort, run without salaries or profits, and intended to further the progress of the concepts implied in the term "psychosomatic medicine." Unlike some publications with a mission, it manages to restrain any urge its editors may possess to express enthusiastic opinions, and confines itself almost exclusively to data derived from experimental and clinical studies of a special type. The impressive list of American editors and contributors is noteworthy for the predominance of internists. Dr. Flanders Dunbar, managing editor, has herself an outstanding position in the field covered by the journal. In its insistence on simplicity of concepts, nomenclature and language, and by its interest in general medicine, this journal should make known to many the extent to which medicine is capable of changing its generally mechanistic, or vaguely dualistic, attitude towards diseased people. It should have a welcome equally from clinicians, medical psychologists and physiologists.

1. *Psychosomatic Medicine:* Experimental and Clinical Studies. No. 1, January, 1939. Published quarterly by the division of anthropology and psychology, National Research Council, Washington, D.C., U.S.A. $5 a year. Monograph supplements in preparation, $4.50 a year.

The next session of the General Medical Council will open on Tuesday, May 23, at 2 P.M., when Sir Norman Walker, the president, will deliver an address.

We regret to announce the death on May 7 of Dr. E. W. TWINING, honorary radiologist to the Manchester Royal Infirmary.

On May 18, 23, and 25 at 5 P.M., Prof. JOHN RYLE will deliver the Croonian lectures to the Royal College of Physicians of London, the subject being visceral neuroses. Members of the medical profession are invited to attend.

Dr. LEONARD CONTI has been appointed head of the medical profession in Germany in succession to the late Dr. Gerhard Wagner. In addition to the title of Reichsärzte-führer Dr. Conti will bear the title of Reichsgesundheits-führer.

". . . If there is one thing on this earth that man can not 'invent,' it is a true chemical compound, because every true chemical compound, as such, is nothing more or less than an ensemble of unpatentable properties of matter, created and quantitatively embodied in tangible substance solely by nature. You can put together mutually reactive substances, and that 'putting together' may well constitute a patentable process, but what you get by, and out of, the interactions of the juxtaposed substances depends wholly upon the volition of nature. Nature, and nature alone, fixes the structure, the composition and the inherent properties of every true chemical compound that is producible by processes devised by man, and neither you or I nor any one else can alter any one of them. Obviously then, no true chemical compound, as such, can be an 'invention.'"—CHARLES E. RUBY, *Science*, April 28, 1939, p. 388.

SPECIAL ARTICLES

RECENT WORK ON THE TRIGEMINAL NERVE

Two papers appeared in March dealing with the trigeminal nerve, one with the surgical treatment of trigeminal neuralgia [1] and the other [2] with the finer anatomy and physiology of the trigeminal nuclei and their central connexions. There has since been a communication in your columns on the surgical anatomy of the subtentorial angle with special reference to the acoustic and trigeminal nerves.[3] Sjöqvist's article was the opening paper read at the Scandinavian Neurological Congress at Stockholm (Aug. 29–30, 1938) during a discussion on the neuralgias. It now appears in English in the issue of the *Acta Chirurgica Scandinavica* which is published as a festschrift dedicated to Prof. Harvey Cushing. It will be recalled that Prof. Olivecrona, the well-known neurosurgeon of Stockholm, was one of Cushing's most brilliant pupils.

Recent physiological work by Adrian and others has shown that the nerve-fibres which conduct painful and thermal stimuli are minute in size compared with those for tactile and proprioceptive stimuli. The minute fibres are most numerous in the first and third divisions of the trigeminal nerve, but in the sensory root between the gasserian ganglion and the pons these fibres are not gathered in any special bundle. As soon as the root enters the pons the minute pain fibres pass almost exclusively into the bulbospinal trigeminal tract, those belonging to the ophthalmic division passing most caudally while those of the third or mandibular division end in the highest portion of the bulbospinal nucleus. The impulses reaching this nucleus are relayed after decussation into the trigeminal fillet which probably enters into close association with the mesial fillet on its way to the thalamus. The larger fibres of the fifth sensory root (tactile, &c.) end in the principal sensory nucleus in the pons, and their impulses must also be relayed after decussation into a part of the ascending trigeminal fillet.

Sjöqvist repeats the old statement, which has been thoroughly disproved, that the facial nerve carries pressure sensation from the face, and that deep pressure pain is preserved after section of the trigeminal sensory root. Though admitting the evidence of autonomic nerve stimulation during the pain crises of trigeminal tic (lacrimation, salivation, flushing), he is doubtful if sympathectomy is ever a cure in cases of atypical facial neuralgias.

THE ÆTIOLOGY OF FACIAL NEURALGIAS

A rough classification of facial neuralgias divides major paroxysmal trigeminal neuralgia into (1) genuine (ætiology unknown) and (2) symptomatic, following affections of the teeth and jaws, sinusitis, aneurysms, tumours and vascular malformations of the cerebello-pontine angle, and disseminated sclerosis. It seems not only unnecessary but unscientific to assume that there is a particular form of trigeminal tic with an unknown ætiology, differing from the very numerous instances of persistent trigeminal tic which may follow severe dental operations, dental sepsis, sinus infection, disseminated sclerosis, and the irritation of tumours in the cerebello-pontine angle. These cases often differ in no respect whatever from the so-called genuine or idiopathic paroxysmal trigeminal neuralgia, either in their type of pain, trigger zones, or results from treatment by alcohol injection or root section. Because these cases are not cured by operation on the teeth, sinuses, or jaws Sjöqvist dismisses the possibility of the neuralgia being of peripheral origin. I have been able to demonstrate that the maxilla, in even edentulous cases of typical trigeminal tic, is crowded with streptococci, and the view that a septic terminal neuritis in the nerve filaments in the jaws is the primary cause will explain the fact that this type of neuralgia practically invariably commences in the maxillary or mandibular divisions. Such a condition may lie latent for years until some exciting cause such as a blow, chill, or intense emotion may precipitate the first attack of neuralgia. In disseminated sclerosis it is easy to understand how the presence of sclerotic patches in the neighbourhood of the spinal trigeminal tract may heighten the degree of irritability of these nerve-fibres, already damaged by septic infection of the jaws at the periphery. Moreover, it is thus easy to understand why bilateral trigeminal tic is far commoner in proportion in cases of disseminated sclerosis, 17 per cent. as compared with 4 to 5 per cent. of other cases of bilateral tic. Heredity is not referred to in these papers, though it is not very uncommon, and in one remarkable family, known to me, eleven instances of trigeminal tic occurred in three generations.

Sjöqvist devotes nearly a page to the view put forward by Frazier and others that some lesion of the thalamus underlies the clinical picture of paroxysmal trigeminal tic, and his only comment is that these investigations need further confirmation. The anatomical distribution of the pain according to peripheral nerves should be enough to negative such a view, without the fact that destruction of the gasserian ganglion or sensory rhizotomy cures the pain permanently.

VARIOUS METHODS OF SURGICAL TREATMENT

In dealing with the surgical treatment of trigeminal tic Sjöqvist emphasises the comparative safety of the Frazier-Spiller method, of section of the sensory root behind the gasserian ganglion, taking care to spare the motor root. Dandy's method of root section close to the pons is generally considered a more serious and dangerous operation, and partial section of the outer half of the root at this spot has been claimed by Dandy to abolish the pain with little or no tactile anæsthesia. Anatomical studies of the distribution of the minute pain fibres in the root do not support Dandy's claim. Alcohol injection of the ganglion requires considerable experience and delicate technique, but so also does the open surgical operation. The statement that alcohol injection has been largely abandoned in favour of root sections when permanent relief of the neuralgia is intended certainly does not apply in this country. Sjöqvist quotes Horrax as advocating a preliminary peripheral alcohol injection previous to root section, partly as a diagnostic test and partly to acquaint the patient with the necessary feeling of numbness of the face. He is inclined to share Horrax's view.

1. Sjöqvist, Olof, *Acta chir. scand.* Fasc. II and III, March 19, 1939, p. 201.
2. Smyth, G. E., *Brain*, March, 1939, p. 41.
3. Stibbe, E. P., *Lancet*, April 15 and 22, 1939, pp. 859 and 918.

Kirschner's method of diathermy coagulation of the gasserian ganglion is condemned as risky and uncertain in its results. Sjöqvist's special method of intrabulbar trigeminal tractotomy is referred to, its special danger being recurrent laryngeal paralysis from damage to the vagus rootlets. The particular value of this operation is the arrest of the neuralgia without the production of tactile anæsthesia, a very valuable gain, as the patients do not complain of numbness of the face, and therefore eating is not interfered with on the affected side. So far some thirty cases appear to have been operated on by this method, at least half a dozen in this country. The future of this operation will be watched with great interest when the results of a large number of cases have been analysed. Section of this trigeminal tract does not appear so far to arrest post-herpetic trigeminal neuralgia. Sjöqvist further claims that such herpes must be nuclear in origin, as he has seen it occur on the anæsthetic area after an incision for tractotomy in a patient whose sensory root had been cut. This anæsthetic area he speaks of as being denervated, but this could not be the case as the nerve-fibres peripheral to the uninjured gasserian ganglion would be perfectly normal, and it is more likely that the ganglion may have been slightly interfered with during the tractotomy operation, as herpes on the anæsthetic face is a not uncommon sequel of alcohol injection of the ganglion. Section of the ascending quintothalamic tract has been performed in two patients, only one surviving, with resultant complete analgesia of one half of the face and the adjacent cervical segments. Sjöqvist throws out the suggestion that such an operation may in the future become standardised, and that it would correspond precisely to the already useful operation of spinal chordotomy. By this means it might be possible to arrest the pain in those hitherto incurable cases of chronic atypical facial neuralgia not amenable to alcohol injection or root resection, and yet not psychalgic in origin. The evidence, however, of a separate ascending quintothalamic tract after decussation is very doubtful, and in all probability these fibres run at first in the mesial lemniscus and later with the spinothalamic tract. The logical analogue to spinal chordotomy would therefore be a localised section of the spinothalamic tract in the upper half of the pons, an operation which savours at present somewhat of Utopia.

THE TRIGEMINAL NUCLEI AND THEIR CENTRAL CONNEXIONS

G. E. Smyth in a careful and excellent review of the experimental, anatomical and clinical work done on the trigeminal nuclei and their central connexions refers to the fact, first shown experimentally in 1892 by Bregmann, that the ophthalmic pain and temperature fibres lie most ventral and the mandibular fibres most dorsal in the spinal trigeminal tract in the medulla. The evidence he produces from the literature and from three clinical cases, two with autopsy, carefully worked out in the National Hospital laboratory, confirm beyond all reasonable doubt the facts that the ophthalmic pain and temperature fibres end lowest in the spinal nucleus, and the mandibular fibres highest at the mid-medullary level. This is described as being in inverse order of the peripheral distribution of the nerves. Rather do the facts indicate that the trigeminal divisions should be renumbered, the mandibular or third division being renamed the first, and the ophthalmic as the third division. If this alteration could be agreed to by anatomists, then the segmental order would be unbroken from the chin and lower lip as the first division, or the most anterior in nerve-supply, upwards to the maxillary or second division and to the ophthalmic or third division and down the back of the head to the 1st and 2nd cervical areas and so to the neck for the 3rd or 4th cervical. The concentric segmental zones of analgesia described by Von Sölder and Schlesinger in syringobulbia do not necessarily indicate a steadily ascending lesion of the medulla, as in this disease the cavitation and the surrounding areas of gliosis are too irregular and indeterminate.

In the operation for trigeminal tractotomy by Sjöqvist's method, in order to obtain total mandibular analgesia, the incision must be made as high as the mid-bulbar level, whereas if the tract is cut at the level of the lowest vagus rootlet, complete ophthalmic and maxillary anæsthesia will be produced, with loss of pressure pain on forehead and cheek and of the corneal reflex. Thermanæsthesia also will be complete over the ophthalmic area, though partial only over the second division. Tactile loss will be completely unimpaired, an interesting confirmation of the fact shown long ago that the cornea is innervated with pain fibres only.

The evidence regarding the upward path to the thalamus of sensory impulses relayed from the spinal and pontine trigeminal nuclei is more conflicting. Wallenberg's and Van Gehuchten's experimental work on rabbits between 1896 and 1901 appeared to demonstrate a quintothalamic ascending tract in the dorsal portion of the formatio reticularis, ending in the ventral nucleus of the thalamus. These results are not confirmed by the pathological findings in the two cases recently worked out at the National Hospital, one of syringobulbia and the other a localised area of medullary necrosis due to posterior inferior cerebellar thrombosis, death occurring 16 days after the thrombotic lesion. This second case is especially valuable, as, owing to the recent lesion, it was possible to follow the degenerations by the delicate Marchi method. This showed degeneration of the internal arcuate fibres starting from the spinal nucleus and decussating in the raphé to run upwards in the medial half of the mesial fillet quite apart from the spinothalamic tract. No degenerated tract was found in the formatio reticularis to suggest a dorsal quintothalamic tract. The quintothalamic tract running in the medial lemniscus probably later on above the mid-pons level approaches closely the spinothalamic tract.

Protest must be made against the continual use of the hybrid "cephalad" which occurs no less than 60 times in the paper. Partly Greek, partly Latin, and wholly horrible, this word is found 12 times on page 76, where also may be read the following disjointed cacophony ending line 15, "caudal and cephalad to the cephalad." What is wrong with the English words upwards, upper, and above, which would make smoother and more pleasant reading and which none but a pedant could pretend to misunderstand in their exactness of application?

Dr. Smyth's article is otherwise an excellent and most painstaking résumé of the subject, and the two carefully worked-out autopsies are a valuable contribution to the anatomy and physiology of the trigeminal nuclei and tracts.

SURGERY OF THE SENSORY ROOT

Stibbe quotes clinical evidence from tumours in the cerebello-pontine angle supporting Dandy's

view that the pain fibres are collected in the posterior portion of the trigeminal nerve, and that they are arranged in the order postulated by Stopford, the ophthalmic most posterior, next the maxillary, and the mandibular most anterior, agreeing with the known order of the fibres in the trigeminal tract and spinal nucleus. In his experimental operations on macaque monkeys, after division of the outer third of the trigeminal nerve immediately proximal to the gasserian ganglion, Stibbe found no corneal anæsthesia, and subsequently little or no degeneration in the spinal or mesencephalic roots. The latter he explains by the large number of bipolar nerve-cells to be found embedded in the sensory root of the trigeminal nerve, especially near the pons, a fact previously demonstrated by Peters, and he suggests that these cells may be trophic for peripheral sensory fibres, and that they may be the source of regenerated fibres after a sensory root division close to the ganglion, and may therefore account for recurrence of trigeminal neuralgia in rare cases.

In two experimental cases of division of the posterior half of the sensory root close to the pons by Dandy's method he subsequently found conspicuous Marchi degeneration of the spinal root in the medulla, and he is of opinion that the whole of the pain fibres in the trigeminal tract were included. He is therefore a supporter of Dandy's contention that a proximal partial resection of the root destroys the pain fibres running to the spinal nucleus. He does not, however, mention the condition of the corneal reflex, which should have been lost if all the ophthalmic fibres were divided.

WILFRED HARRIS.

MEDICINE AND THE LAW

Doctor and Speed Limits

A MAIDSTONE doctor, charged with exceeding the speed limit, admitted that he was travelling at 40 miles per hour in a built-up area, but explained that he was called urgently to a patient suffering from cardiac asthma. In such cases, he said, life could be saved by an injection, but it was often a matter of minutes. The defending solicitor contended that, if a doctor, in order to save a woman's life, was justified in conducting an operation which would otherwise have constituted the serious crime of abortion, he must certainly be justified in committing the minor offence of exceeding the speed limit when a patient's life was at stake.

This decision of a particular bench of justices upon a particular set of facts must certainly not be regarded as a ruling that any surgeon or physician can ignore the Road Traffic Acts in a case of urgency. Another bench, when a doctor next relies on this defence, is just as likely to remind the defendant that, in hurrying to save one life, he may be endangering other lives. There is nothing in the Road Traffic Acts which puts the medical profession in a privileged position. The 1930 act was amended by departmental regulations so as to exempt from maximum speed limits any vehicles which were being used for fire brigade, ambulance or police purposes. In 1934 this exemption was properly incorporated in a statute instead of being enacted by the Ministry of Transport. In January last year the Wells city magistrates held that a private motor-car which conveyed from Glastonbury to Wells a patient with a fractured ankle was being used for ambulance purposes and was therefore exempt from the statutory restrictions on speed. A police car ordered the motorist to stop: he replied "I can't stop now; I have an injured man in the car." He was prosecuted and the case was dismissed. The statute does not say that the vehicle must be a real ambulance, constructed as such. The vehicle is exempt from the provisions imposing speed limits "on an occasion when it is being used for . . . ambulance . . . purposes, if the observance of those provisions would be likely to hinder the use of the vehicle for the purpose for which it is being used on that occasion." Those words, if a little cumbrous, are clear enough. In the Wells case the justices were obviously justified in exonerating the motorist. In the Maidstone case they would have been justified in saying that, if Parliament intended to exempt members of the medical profession when attending urgent calls, Parliament should have said so. On the other hand, if the Maidstone justices had decided to convict, they might have found it a proper occasion for leniency. If the driver is reasonably expert and the traffic conditions are reasonably favourable, a speed of 40 miles an hour may be deemed *malum quia prohibitum* rather than *malum in se*.

Heart Disease and Workmen's Compensation

Last month the Court of Appeal reviewed the claim of a widow under the Workmen's Compensation Act in a case where her husband, suffering from disease of the heart, became seriously ill at his work and died soon afterwards. The county-court judge did not find as a fact either that the death was due to the progress of the disease or that it was accelerated by his work. He dismissed the widow's claim on the ground that she had not established that the workman had suffered personal injury from an accident arising out of and in the course of his employment. There had been considerable discussion at the trial on the question whether a specific injury had arisen from a specific act on a specific date. The widow's case was that the rupture of the aortic cusp occurred on the day of the man's death; the county-court judge found that it occurred three weeks earlier. The Court of Appeal thought that a physiological injury or change occurring in the course of a man's employment by reason of the work in which he was engaged at or about that moment was an injury by accident arising out of his employment. This was so even though the injury or change were caused partly, or even mainly, by the progress or development of an existing disease, provided that the work he was doing at or about the moment of the occurrence of the physiological change or injury contributed in any material degree to its occurrence. It was not necessary to prove any strain or similar cause other than the strain arising out of the workman's ordinary work. The Court of Appeal sent the case back to the county court for a fresh hearing. The judge's reason for refusing the award might be that the man's collapse was solely due to the progress of the disease and that he would have died on that day whether he went to work or not. But the judge had not made any finding of fact to this effect.

There are several important cases on heart disease in relation to workmen's compensation—from Clover Clayton and Co. *v.* Hughes in 1910 to Partridge, Jones and Paton *v.* James in 1933. It is unnecessary for the court to find sudden strain. The question is whether the workman died from the disease alone or did the work help in a material degree?

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

SIR DAVID WILKIE'S BEQUESTS

IT is now well known that the anonymous donor who made possible the extension to the surgical research department in Edinburgh some years ago was Sir David Wilkie, and it has been decided that the department shall in future be known as the Wilkie Surgical Research Laboratory. Under the terms of Sir David's will a further sum of £10,000 has been left to the court of Edinburgh University for the endowment of scholarships for workers in the research laboratory. A further share of his estate has been left to the court for the establishment of research scholarships in surgery and/or medicine, particularly for the benefit of graduates from the British Dominions, the research being, as far as possible, conducted in conjunction with the department of physiology. The amount of this residue is not yet known, but will probably be about £30,000. These bequests will form a valuable addition to the research grants in Edinburgh and provide a suitable memorial to one who was always keenly interested in medical research.

GASTROSCOPY

In a paper read before the Medico-Chirurgical Society of Edinburgh on May 3, Dr. D. M. F. Batty pointed out the progress made since gastroscopy was first introduced, but mentioned that further advance was necessary towards the elaboration of an instrument which would be capable of making all areas of the stomach visible and would combine maximum efficiency with a minimum of discomfort to the patient. He gave a general review of the procedure and of the findings in the normal and the abnormal stomach, referring to the severity of the gastritis which may follow operations on the stomach and also to the frequency with which gastritic changes, especially of the hypertrophic type, are encountered in patients with gastric symptoms. He next discussed the relationship of gastroscopy to other methods of investigation of the stomach and compared its usefulness with that of radiology. The profile views obtained radiologically could not equal in value the appearances obtained by the gastroscopist on direct inspection of the gastric mucous membrane. Radiology, however, provided an accurate impression of the size, shape, motility and position of the stomach in the abdomen, and allowed of the recognition of gross defects such as ulcer or carcinoma. Gastroscopy proved superior in the detection of the finer changes seen in gastritis and in the terminal stages of healing of peptic ulcer, and the method provided a possible means for the early recognition of carcinoma. Furthermore, gastroscopy may be employed to confirm or disprove the radiological findings should the clinical manifestations suggest a different diagnosis. Dr. Batty concluded that gastroscopy constituted a major advance towards the accurate diagnosis of gastric disease, but that it should be used in full collaboration with the clinician and the radiologist.

COÖRDINATION OF HOSPITAL SERVICES

At a recent meeting of the Edinburgh public-health committee Dr. W. G. Clark, the medical officer of health, said that if the Royal Infirmary were reconstructed it would probably be made a much smaller hospital for the reception of acute cases only, and that other cases would be "fed out" to country institutions. The infirmary would remain an important link in any future hospital policy in view of its assets, such as its X-ray department. He gave a welcome indication of efforts being made to coördinate the voluntary and municipal hospitals in Edinburgh. The infirmary is anxious to have more facilities for transferring chronic cases to the municipal hospitals, but the latter have great difficulty in obtaining sufficient nurses. A scheme may therefore be evolved whereby the infirmary nurses do a short period of "chronic nursing" at the municipal hospitals, and so help to relieve the difficulty. Special arrangements are also being considered whereby the corporation can receive some payment for the treatment of infirmary patients. Dr. Clark said that these schemes are only at the stage of preliminary discussion; but coöperation between the hospital authorities is so important that he hoped that the obvious difficulties would be adjusted and that real coördination would be attained.

STANDARD FOR CHORIONIC GONADOTROPHIN

AT the third International Conference on the Standardisation of Hormones, held at Geneva last August, it was decided that international standards should be established for certain hormones of the anterior lobe of the pituitary gland and analogous substances found in urine and serum, and that international units should be defined in terms of a weight of each such standard. The final preparation of these standards, their dispensing in convenient form, and their storage, preservation, and distribution were left to the National Institute for Medical Research.

The preparation of the international standard for the gonadotropic (now called gonadotrophic) substance of human urine of pregnancy (chorionic gonadotrophin) is now complete. The standard has been prepared from substantial amounts of material provided by six firms in different countries. The individual samples having been approved by the conference, a mixture was made and the standard has been finally dispensed in tablets weighing about 10 mg. The international unit is defined as the specific gonadotrophic activity of 0·1 mg. of the standard preparation, which is roughly the amount required to cause cornification of the vaginal epithelium of the immature rat. Each tablet thus contains approximately 100 international units.

Like the international standards for a number of other hormones, drugs, and vitamins, the standard for the gonadotrophic substance of human urine of pregnancy (chorionic gonadotrophin) is held, on behalf of the Health Organisation of the League of Nations, at the National Institute for Medical Research, and is distributed therefrom to national control centres established in other countries, or to workers in countries where such centres have not yet been set up. Applications from the United Kingdom should be made to the Department of Biological Standards, National Institute for Medical Research, London, N.W.3.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—The council of this society has awarded the Chalmers Gold Medal for 1939 to Dr. Max Theiler of the international health division of the Rockefeller Foundation, New York, in recognition of his work on yellow fever and the possibility of producing the vaccine by the use of attenuated virus. The medal will be presented at the annual general meeting of the society at Manson House, 26, Portland Place, London, W.1, on June 15.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM AN AMATEUR JOURNALIST

II

ONE of my colleagues assures me that he can identify the occupation of a man as he enters his outpatient department. Well, so can I, so can anyone up to a point, for some men carry with them in their physiognomy, gait, clothes, mannerisms, a sufficiency of superficial evidence. But my colleague goes further—he gives instances of occupations which must be devoid of any characteristic or peculiarity and he talks of "intuition." I doubt it. In all probability his natural capacity for minute observation and deduction is of superior quality; he brings to bear a wealth of unconscious automatic reasoning, rapidly summated at a mere glance. I suspect that a good deal of what the professional palmiste does is on similar general principles, and that while distracting the attention by appropriate manipulations and patter, pretending to restrict herself to the lines on the hand, she is all the time observing details which will denote occupation, mannerisms, habits and, by implication, possibilities and potentialities. With all of these a lucky guess may then smack of the miraculous, a faux pas is rapidly glossed over and the credulous are impressed, since only the hits are remembered and all the misses forgotten.

We are in our way specialised detectives. Pathological types and conditions strike us at once because they are the things in which we are particularly interested. Perhaps for this reason we are apt to be distracted from the more mundane fields which the orthodox detective is obliged to cultivate, and would be ranked low in the scale of general observation. And yet with our training we might perhaps, if we really tried, display a general analytical capacity well above the average. Dr. Bell of Edinburgh, Conan Doyle's prototype of Sherlock Holmes, was famous for his lightning deductions in the manner of his great fictional representative. We could, I expect, explain why it is that some occupations stamp themselves upon the features and bearing so unmistakably that almost anybody can recognise them, while others baffle the most experienced and observant. Or do they?

Take the jockey, take the whole class of "horsey" men; they might be made from a mould. (I omit of course the familiar "horsey" associations of dress, jewellery and so on.) Here the constant contemplation and society of the horse leads to the features and expression. And so it is when there is intimate association with other animals. The army man is easily recognised and not only on account of his erect bearing. Is there something in the fixed expression imposed by discipline? But why should the naval man be distinctive? Is there some influence of the sea or the breezes or the life or the way of thinking? We recognise the effect of thought in moulding the features, for we have as examples the ascetic divine and the man of law. A tempting explanation is to reverse cause and effect and assume that the cast of features pre-existed and was a mirror of the type of brain likely to ensure success in that particular profession. This might do for selected cases but there is surely too much evidence which supports the idea of occupational influence to justify an alternative explanation.

What shall we say of our own profession? Is there anything at all which suggests a medical face? Think of all your colleagues, including every category; the general practitioner, the surgeon, the consulting physician, the radiologist, the anæsthetist, and all the specialists. Would you, if entirely ignorant of the identity of the man, select first the profession and then the specialty? Sometimes, perhaps, but how often? How interesting it is to meet in the flesh a famous member of the profession whom one has visualised from his reputation or from his literary contributions. And how frequently one is amazed at the contrast between the creature of one's imagination and the actual being. An oculist may turn out to be a very large and heavy-looking being with hands like hams, the last man one would have expected to wield the cataract knife and execute movements of such exquisite delicacy. A surgeon with an international reputation for spectacular operations of the greatest magnitude is revealed as a little fellow with soft brown eyes and the mild retiring appearance of one who would be terrified at the smallest responsibility. Over there is a magnificent dashing-looking man with waxed moustache whom one could easily picture at the head of a cavalry charge: he is a radiologist. A foppish, drawling youngster with a bored expression, who looks as if his chief interest was his figure and his chief care the correct shade of his neck-tie, turns out to be an indefatigable research worker in biochemistry. Here and there are surely prosperous retired brewers and butchers, there is one who looks like a policeman in plain clothes, another like a country parson, another an actor—juvenile lead for choice—and many like nothing on earth. All, however, are eminent surgeons, physicians, specialists whose success denotes that if they have mistaken their vocation, they have at least made a very lucky mistake.

Can there be nothing at all in our education, training or thoughts, no one uniform feature which should impose a characteristic mark? But then, perhaps, we should inquire, what is there to expect? What is the doctor's face? It was different no doubt in the past when the familiar dress, the invariable whiskers and the somewhat lofty pontifical attitude must have helped. We know the original of Fildes's picture—which I think is far from deserving the modern sneer—was a real person. And certainly his is the face of a kind man whom anybody would be glad to see when sick, even if at the present day we do not happen to know anybody who looks like "The Doctor" and are well acquainted with several dear colleagues who do not resemble him in the slightest but whom we would welcome at our bedside.

* * *

The frock-coat was at one time our distinctive dress, almost our uniform, even if it was not restricted to our profession. I myself never had a frock-coat; as a student I missed this indispensable adjunct of qualification by, I reckon, three years. Even the incursion of the morning-coat was regarded as a rather daring innovation for professional use and ceremonial occasions, with perhaps an extension of license to very young men. (I remember a pusillanimous attempt at compromise: the production of a queer garment which was facetiously described as

a misdeal between the two.) And now the frock-coat is almost as unusual an article as a pair of elastic-sided boots. Even the shopwalker has abandoned it, although the undertaker—absit omen—remains faithful. It is a pity, for a well-cut frock-coat is a handsome garment enhancing the dignity of a very tall or very big man. Incidentally it was kinder than its modern representative, the morning-coat, in concealing imperfections. But the silk hat has been almost killed by the motor-car, and without a silk hat the frock-coat is, even with all the laxity and indifference of 1939, quite inadmissible. Or so I suppose.

I well remember seeing a young man in the Haymarket in February, 1900, attired in a frock-coat and bowler-hat and I give you my word that derisive crowds followed that unhappy sartorial solecism at no respectful distance. I doubt if as much interest would be excited today by the appearance in Piccadilly of somebody habited in a dressing-gown and a sou'-wester. So do reactions change with the times. And yet it is still considered contemptible to wear a made-up evening tie. Why? Rather than incur such a suspicion some men will prefer extraordinary products of their ineptitude, giving resemblance to a village bridegroom or the old-time nigger minstrel. A few can produce a perfectly symmetrical result; and yet the more skilful the tying the closer is the approximation to the very effect the well-dressed man is supposed to avoid.

Will the day of the nut, the masher, the toff, the swell, even the dandy ever return? Before the war, one-eighth of an inch in the length of a coat distinguished the real thing from the parvenu. Whether the coat-sleeve bore three or four buttons was almost as important a consideration as the choice of a career. How silly! thinks the modern young man who has gone to the other extreme. Plus-fours can be seen in the stalls of the West End theatres; we know what Rotten Row is like; the footman will not close the door to you if you call on the duchess in a coloured soft collar.

Well, perhaps it is all for the best, although it is a pity to have become so indifferent; for I maintain that dress does affect character and reactions. The policeman out of uniform is a bulky unimposing spectacle; all his majesty and authority pass with his disrobing. The panoply of the Horse-Guards serves a very valuable purpose: justice seems more certain when administered by scarlet and ermine; and perhaps even the lion-tamer's conventional outfit was purposely designed for its intimidating effect. For uniform stands for much. The ass in a lion's skin if he feels like a lion is for practical purposes a lion. If you look the part, you feel the part, you are at your best in the part. I cannot comfortably do a ward-round or participate in a consultation unless in a tail-coat and trousers reasonably decorated with the longitudinal fold in front. A confession of weakness this, especially if the public has by now grown accustomed to our more matter-of-fact dress and has ceased to identify formal clothes with professional importance. We may pride ourselves that we have evolved and have become superior to the thraldom of uniform. Yet still I wonder and hanker and cling a little to the past.

* * *

General appearance and dress. Now may I say a word about voice? I pondered this feature a few weeks back when I accorded an interview to a commercial traveller who had been sent to puff the reputed advantages of some patent food; the type of man you not infrequently receive out of a sense of compassion on the live-and-let-live principle and who departs sycophantically thanking you for having seen him. But the debt was mine, for I sat and listened to him and it did not matter to me one jot whether his particular preparation was all proteins or all vitamins or purin-free or all of them at one and the same time; I wished that he would go on talking for hours, for his voice had that peculiar musical quality to which every nerve in a jaded body vibrated sympathetically. I doubt if he himself was conscious of his rare possession, although obviously it was just such an accomplishment as might be regarded as the greatest asset for his particular occupation. And when he had gone I reflected how rare are the opportunities to listen to a really attractive voice, remarkably so considering the part it plays in human associations and not least in our profession. Our emotions are stimulated pleasantly by the soft, sweet, low, gentle, coaxing, silvery voice: we resent the hard, cold, raucous, cruel, steely voice, one which cuts like a knife or stings like a whip (I have culled all these descriptions from popular novelists). We know that a shrill voice can be as painful as a solo by a slate pencil; a whining, obsequious voice as unalluring as a performance on the bagpipes; a mumbling, slobbering, indistinct voice as exasperating as a rough-edged collar.

But one must make allowances for taste. There is scope here, as everywhere and always, for legitimate difference of opinion; there are, I understand, people who really like the saxophone. It may even be possible that there are some who prefer the "polate" or "refaned" voice, the bleating corruption familiar in certain circles or the colourless production that is alleged to be "Oxford." The deliberately affected drawl of certain public schools is traditional and clear enunciation is "bad form." It is interesting to reflect that a voice is rarely if ever too deep to be attractive and that although a clear tone is in general desirable, there is something singularly pleasing about a certain husky quality.

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I find it occasionally necessary to warn students that although they must recognise certain articulations as pathological, they must not fall into the trap set by mere peculiarities with which they may not be familiar. The speech of an edentulous shepherd from a remote Scottish village may well sound like a queer nervous lesion to a Sassenach ear. During one such occasion of instruction, I was at the bedside of a north-countryman and I observed that "whilst this good man's speech seems a bit strange to us, I daresay our southern pronunciation is queer enough to him." "Aye by Goom ye're reet there" acquiesced the hearty from Yorkshire.

Now there is this uneasiness. Solicitude for the susceptibilities of others has often made me wonder how far it is possible to estimate the effect of one's voice upon others, having regard to the difference between the channels of sound conduction. It's a nasty thought that one may be living in a fool's paradise. I shall never forget the dreadful shock when I first heard a gramophone reproduction of my speaking voice. I fought hard to persuade myself that instrumental distortion was to blame. Yet on the occasions when I have broadcast anonymously, several friends have been quite certain in their recognition of my voice notwithstanding the absence of any expectation to hear it, so there is

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PARLIAMENTARY INTELLIGENCE

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

DURING last week the Camps Bill passed its third reading in an atmosphere of congratulation, and most of the speeches dealt with the civilian school holiday side of the proposals and not the war and evacuation side. But on the evacuation side Mr. Walter Elliot announced that in time of war it would be possible largely to increase the normal accommodation built for educational purposes.

The bill was introduced for third reading by Mr. Kenneth Lindsay in a speech extolling not only the advantages of camps from the health and education point of view but also their delights. Almost it seemed, as one or two speakers mentioned, that Mr. Lindsay was leading children out on to grassy meadows to the piping of a shepherd's flute and forgetting all about war's alarms. It was a pleasant interlude of civilisation in a week devoted for the most part to detailed consideration of duties imposed by the budget, and to the first day's debate on the second reading of the Military Training Bill, usually called the Conscription Bill.

It is a curious reflection on the methods of English legislative procedure that it has required the threat of a major catastrophe in Europe to bring to fruition the idea of camps for elementary school-children which has such a great weight of expert medical opinion behind it. The camps are now being erected because they will serve as additional premises available for evacuation in time of war and not primarily because they will be of great benefit to the health and so to the education of a large proportion of the elementary school-child populations. This was described during the debate as introducing a valuable reform "by a side wind," but a "side wind" is an unduly mild description of the European war storm now threatening. In war-time the camps may prove to have a special value in outbreaks of infectious disease, or where the need arises for the isolation of any special group of children for some other reason. Another "side wind" effect of defence preparations is the extension of piped water-supplies into many rural areas where they did not previously exist. This has not been done for the obvious health reasons but in order to provide water for the local fire brigades now being set up in accordance with recent legislation to deal with fires started by incendiary bombs or other explosions. It only remains to discover a war use for radium to get all the hospitals supplied with as much as they want.

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The Military Training Bill will mean the medical examination of about 300,000 young men this year and of a corresponding, probably larger, number in the next two years. It should provide material for an interesting comparison with the results of medical examinations in 1914–18. The interest is enhanced by the fact that the age-group to be examined is of immediately post-war conception. With regard to medical and dental students the bill raises problems as to the best time for training. For medical students it seems rational to postpone training until the students have passed their intermediate examinations and are at the clinical stage. To train medical students to bear arms as fighting soldiers would no doubt be attractive to many of them, as it was in the late war. But to use partly trained doctors in that way at a time when all indications point to the need for a great increase in the number of doctors to provide for A.R.P. and the like is a waste of trained or partly trained men. It is clear that any army training for medical students must not come too near their final examination, and should be on R.A.M.C. lines. Considerations of the same kind also apply to dental students and on both these subjects there will be discussion in the House.

Another effect of the Military Training Bill is to make wives of conscripts eligible for allowances, and by a more closely connected "side wind" this has involved the lowering of the age of marriage in the regular and territorial forces from 26 as it now is to 21. Will this result in an increase in marriages and an increased birth-rate?

* * *

The effects of the war situation in Europe are forcing many changes on our social structure and social institutions. The present budget with its astronomical figures of military expenditure—rising towards 2 million pounds a day—is being met by loans plus certain increases of taxation, notably 1½*d.* an ounce on tobacco and ¼*d.* a pound on sugar. But that is only for the present and is not much indication of what the future may hold. It is important that medical opinion should be ready to express itself definitely if taxation, let us say in next year's budget, adds seriously to food costs or otherwise affects consumption so as to depress the standards of living. The question of food standards in time of war should also be faced. It should at least be possible so far to profit from the experience of the last war and from the general extension of knowledge of diet as to prevent any serious deterioration. And that is going to give medical M.P.s in the House of Commons quite a lot to think about.

FROM THE PRESS GALLERY

Military Training Bill

ON May 4 in the House of Commons Mr. CHAMBERLAIN moved the second reading of this bill. He explained that the gross figure of the numbers of men between the ages of 20 and 21 who would come under the bill would be 310,000. After making certain necessary deductions about 200,000 men would probably be available for compulsory training this year. The bill was to operate for three years. In the second and third years the number who would come under the bill would be greater owing to the bulge in the birth-rate at a corresponding period some time ago. If the act ran for its full term it would give the Government about 800,000 men altogether. The bill applied to every male British subject of the requisite age who was not ordinarily residing in one of the dominions or colonies or mandated territories. There were a number of

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little hope that the imperfections can all be attributed to artificial modification. Clearly, too, some people must be capable of exact interpretation of all sounds as they are heard by others, for on this depends the whole art of mimicry. And although it seems inconceivable that certain speakers can possibly be unaware of the ugliness of their utterances, we have, I suppose, to consider the enormous range of variations which would be counted under a "musical ear" and perpetually to remind ourselves that there is no disputing about tastes.

exemptions, including the members of the regular forces and those members of the auxiliary and reserve forces who enlisted before April 27. To them must be added those who were found after medical examination not to come up to the standard of medical fitness required.

Dealing with the question of conscientious objectors Mr. Chamberlain claimed that this particular class had been dealt with in a broad-minded manner. A conscientious objector had first of all to apply to be put on a special register, and then a local tribunal would assign him to his appropriate category. He might be finally placed on the register of conscientious objectors without any conditions at all; or he might be conditionally registered, the condition being that he must do some work of national importance as laid down by the tribunal; or he might be registered in the military-training register but be assigned to non-combatant duties. In the view of the Government where scruples were conscientiously held they should be respected and there should be no persecution of those who held them. (Cheers.) All they had to do was to see that they were not abused. The Government had decided that the bill should not be extended to Northern Ireland. They were convinced, however, that the spirit of loyalty in that part of the United Kingdom would result in no smaller proportionate contribution than from the rest of the country. The sooner the bill could be got through the sooner they could assure the safety of the country and the greater would be the effect on public opinion in Europe.

Mr. LEES-SMITH, in moving an amendment on behalf of the Labour Party, said he thought they had been unfairly treated over the pledge of the Prime Minister not to introduce conscription, repeated less than a month ago.—Sir ARCHIBALD SINCLAIR, for the Liberal Party, made no criticism of the Prime Minister's act in revising his pledge against conscription, but criticised the procedure he had adopted, and in particular his failure to consult beforehand the leaders of the opposition parties and of organised labour who had responded to his appeal to support the Government in their campaign for voluntary service, a response which was made on the basis of that pledge.—Sir HUGH O'NEILL voiced the protest of Ulster members against the exclusion of that province from the bill. He described this as a surrender of the United Kingdom Government to the dictates of the head of the government of the Irish Free State.

Mr. PICKTHORN said he had made wide inquiries as to what was being thought in the universities. Nobody responsible for any educational institution, or any pupil or student, desired preferential treatment, but under clause I of this bill the Minister, if he was satisfied that there was good cause, might authorise persons registered either to do their service earlier than normally, or to postpone it. He hoped that educational arrangements would come within the scope of the words "good cause." He asked that people who were finishing a course this June should know as soon as possible that they would not be called up before they had taken their examinations in the first or second week of June. A public statement to that effect would be very helpful. If it was intended during the next two or three years to call up university undergraduates in the course of the curriculum he hoped that the calling up would not depend on accident of birthdays. Educational arrangements would be knocked endways if one lot were called up in January, another in February, and so on. He hoped it would be found possible to call them up at one date in the year, preferably in the spring, so that the six months would cover the period of the long vacation.

Mr. ERNEST BROWN, Minister of Labour, said that the announcement of the intention to introduce compulsory military service had not had an adverse effect on the voluntary national-service schemes. In both of the last two weeks there had been a record number of applications for voluntary enlistment. But on a voluntary basis they could not have obtained the same number of trained men in the same time as they would get by the compulsory system. There would be three stages in the working of the bill: (1) registration in the military training register; (2) medical examination; and (3) calling up for training. All men would be required to register as far as possible on the same day. The bill recognised anticipation and postponement in order to meet hardships. That, of course, would affect educational careers. There would be Military Training (Hardship) Committees and they would deal with cases of anticipation or postponement. Individual notices would be served on men who were registered to attend for examination before a medical board. There would be about 120 medical boards at convenient centres throughout the country. The Government appreciated the great importance of medical examination in order to secure that men were not subjected to training which would be injurious to their health. Each medical board would consist of five qualified medical practitioners and it would have authority to direct examination by a consultative examiner in special cases. Men who had passed the medical board would receive their individual notices to present themselves at the appropriate reception depôt for military training. At least ten days would be allowed from the date of the notice for the men to make arrangements. It was proposed to call up the men in approximately equal batches beginning in June. The Government understood that it was of importance to a great number of students to know the exact details of the arrangements.

On May 8 the bill was read a second time after a Labour amendment had been defeated by 387 votes to 145.

Liability of Local Authorities

In the House of Commons on May 3 when the Limitation Bill, which has already passed through the House of Lords was considered on Report, Mr. FOOT moved an amendment to extend the period within which an action might be brought against a public authority from one to two years. He said that as the law stood the period within which an action might be brought against a defendant in the ordinary way was six years, but where a public authority was the defendant the period was only six months, and in fatal cases twelve months. This led to great and undeniable injustice. The case of Freeborn versus Leeming showed the sort of thing that happened as a result of the Public Authorities Protection Act:—

The plaintiff being injured in an accident was taken to the workhouse infirmary and placed in the care of the defendant, the medical officer. The defendant negligently failed to diagnose the nature of the plaintiff's injury and made no attempt to give him the treatment which, if given at the time, would effectually have cured him. On Oct. 15, 1923, the plaintiff left the infirmary and from that time ceased to be under the defendant's care. He consulted another doctor who discovered that his hip was dislocated. As it was then too late to apply the necessary remedy, the plaintiff's injury was permanent. On April 25, some six months after he had ceased to be under the defendant's care, he brought his action claiming damages for negligence:—

Held: That the action was barred by section 1 of the Public Authorities Protection Act, not having been brought within six months next after the act, neglect or default complained of.

Continuing, Mr. Foot said that this bill effected an improvement, because it raised the period from six to twelve months, but it was the unanimous verdict of those who were familiar with these matters that the period of twelve months was not enough.

Mr. SILVERMAN said it was no good saying that no public authority would take advantage of its rights under the act. A public authority had no right to do otherwise, for it administered public funds. In connexion with the recent outbreak of typhoid fever at Croydon, it was ultimately decided in a friendly action in the High Court that the epidemic was due to faults on the part of the authority and damages were awarded. But by the time that had been established the period of six

months had been exceeded. The Croydon authority wanted to do the right thing and pay appropriate damages, but in order to do so they had to come to Parliament and present a private bill which was now before the House. He knew of a small boy who was treated in a city hospital and was burned through being left too long in the electric blanket with the result that he would have a permanently deformed leg. The child's guardians instead of going to a solicitor left the matter in the hands of a councillor on the assurance that he would take the matter up. The councillor no doubt honestly meant to help, but unfortunately the statutory period of six months slipped away before any settlement was made and the authority were debarred from paying one penny damages to the child. Was it right that because of this perfectly arbitrary time limit that child should have to go through life with a permanently deformed leg, unable to earn its living and without a penny of compensation merely because the hospital in which the injury was sustained happened to be owned by the city instead of being a voluntary organisation?

Mr. MARSHALL said that this protection to public authorities had existed for 300 years, and surely it had not been given without some good cause. Local authorities feared that if the period was extended any further than the bill proposed they would be open to a vast amount of unfair litigation. There was a great difference between local authorities and private individuals. The local authorities were compelled to do their work, and they were entitled to special protection.

Sir DONALD SOMERVELL, Attorney General, replying for the Government, said that the position before the passing of the act of 1893 was that in public-health matters there was a general legal limitation, applying to all local authorities, of six months. Other activities of local authorities were dealt with by a series of statutes, nearly 100 in number, some public and some private, but in all of them Parliament had put a short period of limitation on all statutory undertakings performing a statutory duty. He had a greater respect for his predecessors than to suppose that 100 statutes went through Parliament without anybody noticing that they involved the principle that the bodies that might be made liable for actions were placed under a duty by Parliament. There was the further point that while in the interests of justice a reasonable time should be allowed for claims to be brought, it was also in the interests of justice that claims should be brought promptly. The necessity for bringing claims promptly would occasionally mean that exceptionally hard cases were cut out by the period of limitation. The alteration of the law embodied in this bill was, he claimed, a reasonable one. The publicity given by this debate would make the public realise the existence of this limitation, and would make local authorities realise that if with this extended period of time there were still cases of injustice the House of Commons would jealously watch and see that under the new provisions injustice such as had occurred in the past would not occur again.

Midwives and the Motor-licence Duty

During the discussion of the budget resolutions in the House of Commons on May 2 Mrs. TATE said that one body of people on which the increased motor-licence duty would fall with great severity would be the district nurses and midwives. They needed a car for the carrying out of their profession. Since the passing of the Midwives Act it had been necessary in country districts to increase the funds raised towards the payment of a district nurse, and it would not be possible to raise the extra £6, £8, or £10 a year for the tax. She hoped that the Chancellor of the Exchequer would find some way of differentiating between a car which was a luxury and one which was a necessity for the carrying on of business.—Sir JOHN SIMON, Chancellor of the Exchequer, said he recognised that many people were obliged to use a motor-car for business purposes, and in such cases the expenses of the car were deductable for the purposes of income-tax. He would suppose that this principle would apply to a doctor who used his car for the purposes of his profession. He quite saw the force of the objections that had been raised, but he had thought it better to make an increase in this direct tax rather than, for example, to increase the income-tax or reduce the rates of allowance for income-tax. Under his proposals the man with a big and expensive car would pay, as he ought to do, more than the man with a small low-powered car.

Road Accidents

In the House of Lords on May 3, when Lord NEWTON asked that attention should be given to the report of the Select Committee on Prevention of Road Accidents, Earl DE LA WARR, President of the Board of Education, said a great deal of this problem was psychological. Some people were so accident-prone that whatever form of transport was used they would somehow get hurt. No regulations and no prosecutions were a substitute for a right feeling. Propaganda properly used was one of the most potent methods of prevention. A great deal was being done to make children traffic conscious by the thorough grounding in road behaviour that elementary and secondary schools gave their pupils. The Government were taking steps to deal with the question of noise, and an agreement had been reached with the motor manufacturers which would operate from July 1. The select committee's report was receiving the serious consideration of the Minister of Transport, and the fear that it would be pigeonholed was unfounded.

The Camps Bill

On May 3 in the House of Commons the Camps Bill received its third reading. Mr. LINDSAY, parliamentary secretary to the Board of Education, said that the purpose of the measure was twofold—evacuation in war-time and education in peace-time. The peace-time uses of these camps were extremely important. Many of the sites had been chosen and some of the camps would be ready, he hoped, by September. Much of the talk about the utilisation of these camps by adults and the possible effects on seaside resorts was completely beside the point. He wished to see relays of town children filling the camps during term-time, and in the holidays he would like to see the various juvenile associations using them on reasonable terms. There were now between 18 and 20 recognised camps with a total accommodation of about 1400. About half of those who attended the present camps were sick and weakly children sent there on the advice of the medical officers in their districts. By the construction of the new camps it would be possible to send relays of children to the country. Two weeks in these camps would be worth two months in some of the schools in urbanised areas. Here was a chance of restoring what had been lost to many children—namely, an acquaintance with the country at an impressionable age. This bill was only part of a great national movement to restore to a rather over-urbanised and nerve-ridden world something of the peace and simplicity which came from living in and knowing about the country. A bill which presented the possibility of 250,000 children getting a fortnight in the country every year ought not to be regarded only as a measure dealing with evacuation, important as that was; the bill was also part of a more sensible and healthy approach to education.

Mr. NOEL-BAKER pointed out the difficulty of making camps which would be suitable for children at one part of the year and for adults for the rest of the year. He hoped the Government would establish experimental camps for adult holidays, for which there was an enormous demand.

Mr. SPENS hoped the Government would see that the areas in which the camps were placed were not subjected to trouble and expense as a result of the

outbreak of infectious diseases. He cited an instance on the Kent coast where scarlet fever broke out and a great number of children had to be sent to the local isolation hospital, the accommodation of which was fully occupied for several weeks. Those who were responsible for sending the children to that camp refused to pay a penny towards the cost of nursing them in the hospital, and the expense fell on the local rates.

Dr. HADEN GUEST said he hoped there would be a great development of these camps especially on the medical side. The camps might be used more than was at present contemplated for open-air education of large classes of children. Large numbers of children went to the few open-air schools already in existence, where they had special food and so on. If these children could have their education in school camps they would be enormously improved in health, and if taken early enough many children might be restored to real normality. It should be the aim to give every child in the country a holiday.—Miss WILKINSON said this was not the time to discuss whether as a pleasant piece of educational policy it was rather nice for the Government to give a bit of money for an experiment to take slum children out for a fortnight's holiday. A.R.P. wardens and committees knew that this was not a holiday camp bill, and they wanted to know to what extent this represented the Government's attitude towards camp evacuation. She felt sure that hospitality evacuation would break down, but the one type of evacuation that would not break down was properly prepared sites and camps in areas which were unlikely to be bombed and which could be properly safeguarded.

Mr. ELLIOT, Minister of Health, said it should not go out that billeting was bound to break down. They must rely on billeting in the main for the evacuation of children, mothers and sick people. In passing this bill it would be wrong to omit any necessary consideration of war problems, but it would also be wrong to overlook the chance here given of doing a real piece of work which would redound to the benefit and health of the school-children of the country.

Collections for Voluntary Hospitals

In the House of Commons on May 5 the Charitable Collections (Regulation) Bill was considered on Report. Mr. H. G. WILLIAMS moved an amendment designed to prevent hospitals being subjected to unnecessary trouble and their collectors to penalties owing to the fact that the operations of the hospital were concerned with people who lived in a number of police districts, or parts of a number of police districts. He had put the amendment down at the request of the British Hospitals Association who were greatly perturbed on the matter. Many applications would be requisite in these cases, and all the applications might not be made. There would then be a risk of hospital collectors subjecting themselves to penalties.

Earl WINTERTON said that the argument that there would be trouble in having to apply to several police authorities was one which applied not only to hospitals but to all charities whose activities extended to more than one police area without covering a substantial part of the country. The trouble involved, however, would not be very great. The charity would no doubt apply to the police authority for the area in which its activities were chiefly centred and give full particulars to that authority. This could be stated in applications to other authorities, and the police authorities concerned would coöperate to avoid unnecessary duplication of inquiries.—The amendment was withdrawn.

In the House of Commons on May 9 the Reserve and Auxiliary Forces Bill, which simplifies and accelerates the procedure for calling up the reserves, was read a second time.

QUESTION TIME

WEDNESDAY, MAY 3

Slum-clearance Expenditure

Mr. TOM SMITH asked the Minister of Health if he was aware that many local authorities had passed resolutions urging the Government to undertake a larger proportion of the expenditure on the demolition of unfit houses and the alleviation of overcrowding, contending that the rehousing of the working classes was a matter of national concern, and that local rates should not be unduly burdened in consequence; and whether any action was contemplated in the near future.—Mr. BERNAYS, parliamentary secretary to the Ministry of Health, replied: The rates of exchequer subsidy for the purposes mentioned were fixed by Parliament only a year ago and my right hon. friend has no reason to suppose that they are inadequate. The statute provides for a review of these rates after Oct. 1, 1941.

Mr. SMITH: Is not the Minister aware that many local authorities in industrial districts which have a low rateable value are finding their work harder in this direction, and would it not be a good thing to have legislation to move these old houses out of existence more quickly than is the case today?—Mr. BERNAYS: As regards the subsidy, the hon. gentleman will bear in mind the fact that the overcrowding subsidy now payable balances any reduction that there has been in the slum-clearance subsidy.

THURSDAY, MAY 4

Concessions to Blind Income-tax Payers

Mr. DE LA BÈRE asked the Chancellor of the Exchequer whether he would be prepared to make some additional allowance or remission of taxation to blind income-tax payers who had to pay for certain expenses for which those who were not subject to this disability were not liable.—Sir JOHN SIMON replied: This suggestion has already received careful consideration and has been found to present serious difficulties. I have further considered this matter, but I regret that I cannot see my way to make any special allowance or remission such as is suggested.

Mr. DE LA BÈRE: Is the right hon. gentleman aware that the cost of this provision would be quite a negligible amount? Is he not further aware that all parties support the proposal to assist these people who are in so much need of assistance?—Sir J. SIMON: There are considerable difficulties in giving this class of relief. There are gradations both as regards blindness and other forms of disability. The matter was considered by the Royal Commission on Income Tax in 1920, and they reported that they could not advise any relaxation of this nature.

Tuberculin-tested Herds and Inoculation against Abortion

Brigadier-General CLIFTON BROWN asked the Minister of Health why the regulation forbidding inoculation of cattle against abortion was maintained for a tuberculin-tested herd, in view of the fact that inoculation for the same purpose was allowed for attested herds; and that numerous county veterinary officers had advised that this regulation for tuberculin-tested herds be abolished.—Mr. ELLIOT replied: As at present advised, I am not satisfied that an amendment of the orders removing the restriction as regards tuberculin-tested milk would be justified, but in view of the representations which I have received I am considering the matter further in consultation with the Minister of Agriculture.

Water Pollution by Gulls

Colonel HENEAGE asked the Home Secretary whether his attention had been called to the increasing danger to public health caused by the flocking of gulls to reservoir waters belonging to water undertakers; whether he would take steps to amend the law so as to enable water undertakers to prevent the pollution of their water-supplies by the destruction of gulls, wild duck and other fowl whose recourse to garbage heaps and sewage works and subsequent settlement on reservoirs constitute a serious danger to public health; and whether he would receive a deputation from the British Waterworks Association to

discuss the matter.—Sir SAMUEL HOARE replied: I have not received any general representations on this subject, nor, I understand, has my right hon. friend the Minister of Health. Any proposal to amend the law so as to permit the killing of gulls or other wild birds during the close season would need to be carefully examined, but I should be glad to consider any representations which the British Waterworks Association desires to make.

Proprietary Toothpaste and the Poisons Act

Sir ROBERT TASKER asked the Home Secretary whether he was aware that a certain company had been endeavouring for three years, by application to the Home Office, to secure the exemption from the first schedule to the Poisons and Pharmacy Act of a well-known and widely used toothpaste manufactured in this country, that their appeal had been endorsed by over 500 practising dentists and licentiates in dental surgery; and would he take steps to ensure that the company's petition for exemption received early attention.—Sir SAMUEL HOARE replied: The manufacturers of a toothpaste which contains an organic compound of arsenic applied to the Home Office in January, 1936, to have it excluded from the first schedule to the Poisons Rules, 1935, and so exempted from certain requirements of the Pharmacy and Poisons Act, 1933. It would not be practicable or desirable to exempt particular proprietary products, but very careful consideration was given to the question whether there should be a general exemption for dentifrices containing organic compounds of arsenic. Full inquiries were made and I was advised that the application of the restriction did not adversely affect the interests of the public and that exemption should not be granted. In July, 1938, the manufacturers again applied for exemption and submitted a list of dentists who are said to support the application. Further inquiries were made and I have referred the matter to the Poisons Board for consideration at their next meeting.

Iron-ore Dust and Silicosis

Mr. THORNE asked the Home Secretary if he could give any information in connexion with the inquiry into silicosis deaths brought about by the inhalation of dust from iron-ore; and whether he had received the verdict of the jury at the inquest that was held at Romford on April 22.—Mr. PEAKE, under-secretary, Home Office, replied: As a result of inquiries by the Medical Research Council it is recognised that hæmatite iron-ore mining is liable to give rise to silicosis, and by an order made in 1935 the silicosis scheme was extended to cover underground workers in this industry. I have seen a press report of the inquest referred to in the second part of the question, from which it appears that death was due to silicosis, but that the deceased workman was last employed in the iron-ore industry in 1933. My right hon. friend has no statutory power to extend the scheme retrospectively so as to cover cases where the workman had left the industry prior to the date of the order.

Medical Certification of Mentally Deficient Children

Sir A. WILSON asked the Minister of Health whether his attention had been drawn to the judgment of the King's Bench Divisional Court on April 26 as to the validity of a certificate under the Mental Deficiency Act, 1913, signed by two doctors, one of whom had not even seen the person to whose mental condition he testified; what steps he proposed to take by amending the regulations or otherwise to prevent injustices consequent upon such unprofessional conduct; and whether he would call upon the Board of Control for a special report on the subject.—Mr. LINDSAY, parliamentary secretary to the Board of Education, replied: Under the provisions of section 31 of the Mental Deficiency Act, 1913, it is the duty of the local education authority to make arrangements, subject to the approval of the Board of Education, for ascertaining what children are incapable by reason of mental defect of receiving benefit from instruction in special schools or classes, and for that purpose to obtain in each case a certificate, in a form prescribed by the Board of Education, from a duly qualified medical practitioner approved by the Board of Education. The section further provides that in cases of doubt the matter shall be determined by the Board of Education. The approved arrangements require the child to be examined by the approved medical practitioner who is to give the certificate. In the case referred to in the question the court appears to have criticised the proceedings of the local education authority on the ground, first, that the certificate was signed not only by the approved medical practitioner who had examined the child but also by a second medical practitioner who had not examined the child, and secondly, on the ground that the case (being one of doubt) was not referred to the Board of Education for determination. There is nothing in the approved arrangements to countenance the signing of the certificate by the second practitioner who has not examined the child, but my noble friend is making further inquiries in the result of which he will consider whether any change in the prescribed forms of certificate is desirable.

MONDAY, MAY 8

Typhoid at Nottingham

Mr. LIDDALL asked the Minister of Health what was the cause of the recent typhoid outbreak in Nottingham which had been the subject of investigation by his officers.—Mr. BERNAYS, parliamentary secretary to the Ministry of Health, replied: The investigations in connexion with this outbreak were carried out by officials of the town council, though a medical officer of my department visited Nottingham at the request of the medical officer of health to confer with them in order to ensure that all practicable steps were being taken to cope with the outbreak. A statement was issued by the council in the local press on March 23, which indicated that the outbreak was due to the consumption of food which had a very limited distribution.

Uniforms for Civil Defence Nurses

Mr. LIPSON asked the Minister of Health if uniforms would be provided free to women who were willing to volunteer for training as nurses under the National Service Scheme.—Mr. BERNAYS replied: An overall and cap will be provided free to all women who take the short course of training for enrolment as nursing auxiliaries in the Civil Nursing Reserve.

Gas-masks for Hospitals and Doctors

Sir JOHN MELLOR asked the Lord Privy Seal whether, after consultation with the medical profession, he would make special arrangements for a supply of gas-masks to be available to hospitals and practitioners of the type found most convenient for surgical operations.—Captain DUGDALE, Lord of the Treasury, replied: My right hon. friend has arranged, in consultation with the Ministry of Health, that all medical and nursing personnel in hospitals or first-aid posts in vulnerable areas shall be supplied with the civilian-duty type of respirator.

Sir J. MELLOR: Do recent experiments confirm that this type is the best for the purpose?—Captain DUGDALE: So I am given to understand.

TUESDAY, MAY 9

Rheumatism among Mineworkers

Mr. DAVID ADAMS asked the Secretary for Mines whether he was aware of the establishment of a clinic for the treatment of rheumatism among mineworkers at Horden collieries; and in view of the prevalence of this affliction among miners he would give special attention to this experiment with a view to its general extension in the coalfields.—Mr. GEOFFREY LLOYD: Yes, Sir. I am aware that discussions are in progress for building and equipping a clinic at the Horden colliery baths by means of grants from the Miners' Welfare Fund. This experiment will be the first of its kind and I shall watch the results with close interest.

Vaccination of Army Recruits

Mr. LEACH asked the Secretary of State for War whether he would follow the precedent of his department in 1916 in regard to the vaccination of recruits and suspend the vaccination regulations so far as conscripts were concerned.—Sir V. WARRENDER: Yes, Sir.

LETTERS TO THE EDITOR

PSYCHOTHERAPY BY LAYMEN

SIR,—In your issue of April 29 Dr. Clifford Allen points out the dangers which might attend the recommendation of the British Medical Association to admit the laity with certain reservations into psychotherapeutic practice. The medical profession is sometimes termed the most powerful of all trade-unions. This dictum may contain a modicum of truth, but it certainly omits one matter of vital importance. Medical etiquette, custom and practice do not derive from the whims of medical despotism; they were primarily evolved in the interest of the patient. Medical qualifications illustrate this fact. They give the public some guarantee of the bona fides of their possessors. There is no good reason why psychological medicine should be differentiated from the rest of medical practice.

In the first place mental maladjustment forms a large, if not a major, part of illness in general. In the second place the adequate treatment of the patient who is "physically ill" may also require a certain degree of sound psychological insight, gained in part by right training, on the part of the doctor. Is it not equally necessary that the person dealing with mental illness should have a sound knowledge of the physical aspects of the patient's personality? But the reverse—namely, a one-sided attitude to the neurotic patient—is the possibility which the proposed changes may bring with them.

In his lecture on neurophysiology and psychology, which you reported last week, Dr. Emanuel Miller maintains that the solution of the problem regarding the respective provinces of these two branches of medicine lies neither in the enthronement of psychology at the expense of neurology, nor vice versa. Both must abdicate in favour of a biological attitude—the whole in place of the partial view. After all the very derivation of the word "health" is from the Anglo-Saxon *hál*=whole, hence *wholth* or health. Some years ago a man could be qualified either as a physician or as a surgeon; now qualification in both branches is essential before legal status is granted to the doctor. Should there be any step back from this?

One further point. The holding of a medical degree gives its possessor the legal right to practise, but it carries with it corresponding responsibilities. The layman who is given the right to practise psychotherapy does not incur a like obligation. This fact may have far-reaching, even serious, consequences.

I am, Sir, yours faithfully,

New Cavendish Street, W.1, May 8. HILDA WEBER.

ILLNESS IN SMALLPOX CONTACTS

SIR,—A few weeks ago Dr. C. R. Box was good enough to suggest, in a letter published in your columns, that interest would be added to my article on illness in smallpox contacts, which appeared in your issue of April 8, if "exact details of the method of vaccination were given." Of the 7 smallpox contacts whose illness formed the subject of my article, 6 were revaccinated during the time which elapsed between contact and the development of the subsequent illness. In 4 of these 6 the revaccination was carried out with Government lymph, each person being done with a different batch. The remaining 2 were both revaccinated with one batch of a proprietary lymph. In all 6 the revaccination was carried out on the left arm, the contents of not more than one tube of lymph being used for each person. In 5 the arm was prepared, after preliminary washing with soap and water, by methylated ether. In 1 soap and water only was used. In all 6 only one insertion was made. In 4 the insertion was carried out with a nib-type scarifier, and in 2 by means of ordinary household needles, the heat of a flame being used for sterilisation in all instances. In all 6 two scratches were made, and in all the lymph was allowed to dry before a dressing of plain lint was applied. In 1 instance a control scratch was made on the same arm as the insertion.

The 7 persons referred to in my paper had been vaccinated and revaccinated on previous occasions, but I have been unable to obtain technical details of these events. It may be said, however, that in 4 of them the primary vaccination to which they were subjected in infancy was, to judge from the arm scars, by four insertions. In 3 instances, where there was some recollection of the manner in which previous revaccination had been carried out, single insertions had been made.

In a letter published in your issue of April 22 Dr. M. H. Gordon inquired regarding the distribution of non-contact cases which subsequently occurred among the population of 42,000 resident within one and a half miles of the hospital in which the imported case was nursed. There were 6 such non-contact cases which can be arranged in four groups that are neither directly connected with each other nor with the first imported case. The 1 case composing the first of these four groups, the first case of the second group (2 cases in all), the first case of the third group (2 cases in all) and the 1 case in the fourth group were resident at the time of infection at distances of approximately a quarter of a mile, one and a half miles, one mile and three-quarters of a mile respectively from hospitals containing at least 1 case in the acute stage. In view of the limited number of cases which occurred in this outbreak, figures for the aggregate incidence per hundred houses within stated distances of the two hospitals concerned would not appear to be significant.

I am, Sir, yours faithfully,

E. T. CONYBEARE.

Ministry of Health, Whitehall, S.W.1, May 5.

SODIUM AND CHLORINE RETENTION

SIR,—Reading Dr. E. N. Allott's article in your issue of May 6 (p. 1035) I am reminded of a case I saw some months ago.

A girl, aged 12 years, with a four-months history of increasing headache and vomiting, had an astrocytoma occupying both optic thalami and practically filling the interpeduncular space; it was beginning to invade the optic tract on the left side and the optic tract on the right side was tightly splayed over it. It so happens that among the examinations made two weeks previously, on the girl's admission to the Hospital for Tropical Diseases, were certain which bear on the points raised by Dr. Allott. These determinations were (1) blood: urea, 30 mg. per 100 c.cm., chlorides, 412 mg. per 100 c.cm.; (2) urine: acid, sp. gr. 1·022, no albumin, no casts or cellular deposit, chlorides only trace, and urea 2·3 per cent.; (3) blood-pressure 130/175.

There was no indication of any renal damage, and the surprisingly low chloride content of the urine fits in with Dr. Allott's interesting thesis.

I am, Sir, yours faithfully,

Harley Street, W.1, May 8. F. MURGATROYD.

BIOCHEMISTRY OF MALIGNANT GROWTH

SIR,—The leading article in your last issue and your abstract of the paper of Kögl and Erxleben call to mind the theories of John Beard of Edinburgh, who in 1907 published his "conclusion that the albumins of cancer and of malignant tumors in general must be dextro bodies." It would now appear that more than thirty years ago Beard was not wholly off the right track. In the *Medical Record* of March 29, 1913, Beard published a paper "on the occurrence of dextrorotatory albumins in organic nature." While fully recognising the speculative and sometimes polemical nature of the writings of this embryologist, from the time when he proceeded from his researches on the migration of elasmobranch germ-cells to theorise on the cancer problem, it is appropriate now to remember his researches and writings The time has not arrived when to these a final value can be assigned. In view of the importance attached to trophoblast in relation to the cancer problem by Beard and also by Blair-Bell the results of stereochemical analysis of chorionic tissue will be of particular interest.

I am, Sir, yours faithfully,

Cuminestown, Aberdeenshire, May 8. A. T. FORBES.

IS RADIOLOGY A SPECIALTY?

SIR,—Dr. Jennings's letter in your issue of April 29 cannot be allowed to pass without comment. Of his many propositions the chief seem to be: (1) that diagnostic radiologists should be abolished; (2) that radiographers should have more responsibility; (3) that various specialists should supervise the radiological work appropriate to their department; (4) that students should be taught more diagnostic radiology. May I pass straight to the second proposition which also involves the first. I have a high respect for the work of radiographers but I do not think that their responsibility should be increased, particularly as diagnostic radiology is becoming more and more complex.

One of Dr. Jennings's arguments for the abolition of radiologists is that private patients have to see too many specialists, and that their bills become too great. In that case let us scrap pathologists, let us scrap clinical biochemists. I have seen many a mortuary attendant perform a beautiful autopsy, and many a laboratory assistant is a skilled microscopist. Whoever doubts the accuracy of the laboratory assistant's blood-sugar estimation, and why should not the physician interpret the pathological findings?

Returning to the problem of radiology, surely it would not be wise to ask technicians, for example, to apply pressure on ureters in pyelographic examinations, or to fill the fourth ventricle in air examinations of the brain? Modern radiology does not consist in "shooting" a number of standard pictures, but in analysing each case on its merits and in attempting to give an exact diagnosis. The exact analysis of a difficult acute abdominal case is surely outside the scope of a technician. Should the investigation be carried out by a team consisting of an abdominal surgeon and a gastro-enterologist backed up by a technician? One illustration occurs to me, and many others could be given, of Dr. Jennings's contention that specialists should do their own radiology. I have recently had the opportunity of seeing and comparing the neuroradiological work at two large neurosurgical clinics on the Continent. In the one the radiologists work in close collaboration with the neurosurgeon, in the other the surgeon works in conjunction with his X-ray technicians. The difference in the quality of the work in the two places is immediately apparent.

Dr. Jennings says that nothing is to be gained by the radiologist's report "increased root shadows" or "greater density at one apex." I heartily agree; but also nothing is to be gained by the physician's report "slight chill on the liver, stomach, sciatic nerve or what-not." Both types of diagnosis are based on incomplete examination, ignorance, or both. Neither clinical medicine nor diagnostic radiology should be damned on such grounds. May I suggest that some of Dr. Jennings's problems would be solved by closer collaboration between clinician and radiologist, rather than the not infrequent practice of working against one another.

Finally, I strongly endorse the suggestion that students should be taught more diagnostic radiology. Dr. Jennings's friend states that English students know more about microscope slides than X-ray films. Would that they knew much about both—not to make them specialists in either branch, but to make them better doctors.

I am, Sir, yours faithfully,

Stockholm, May 5. JAMES BULL.

MEDICAL CELIBACY

SIR,—It is disturbing to note the increase which appears to have taken place in advertisements for single men appearing in medical journals. Other workers are making some effort to abolish these unnatural restrictions; but medical men seem prepared to accept this unwarrantable interference with their liberty without a murmur of protest. There is no limit to the number of children that a mental defective may have if he or she does not happen to be certified. But a man who has the necessary intelligence and perseverance to become a medical practitioner is not even allowed to marry. I should be the last person to exaggerate the importance of heredity, but if it plays any part at all—which one must concede—then this state of affairs is hardly in the national interest, especially at a time when a falling birth-rate is arousing nation-wide concern.

It is hard to see what possible justification such a restriction can have. It is certainly untrue to say that a married man pays less attention to his work. One is reluctantly forced to the conclusion that the ban is merely an excuse for niggardliness on the part of the hospitals or authorities concerned.

I am, Sir, yours faithfully,

B. H. KIRMAN,
Secretary, Medical Group, Left Book Club.

St. Mary Cray, Kent, May 5.

TOLERANCE OF PHENOL VAPOUR

SIR,—With further reference to this subject (see my letter in your issue of March 18), I have today subjected myself and a collaborator, Mr. Edwin Burgess, to phenol vapour. The same room and apparatus were used as in all the experiments referred to in my letter—viz., a small laboratory measuring 12 ft. 11 in. long by 10 ft. 4 in. wide by 10 ft. 5 in. high, and of approximately 1400 c. ft. capacity. It has well-fitting window and door, but no fireplace or ventilator, and was not sealed, since former experience had shown that there is practically no leakage. Messrs. Calvert's vaporiser was used, pre-heated electrically for twelve minutes before addition of the phenol. The phenol is weighed into a tared beaker, and the beaker with phenol is inverted into the heated container of the vaporiser. The phenol vaporises as a column of beautiful dense white

"smoke," which ascends, rolls round and down, and finally diffuses throughout the room, forming for a few minutes a thickish fog, which soon clears and dissipates. Three tests were done in the course of two hours with 28, 50 and 60 grammes of phenol, equivalent to about 20, 35 and 42 g. per 1000 c. ft. respectively. We sat in the closed room during the course of each test (for about twenty minutes), but suffered no inconvenience; there is a slight odour and taste of phenol, but no lacrimation and not a cough or a sneeze even with the largest quantity. As it had been found that 35 g. of phenol per 1000 c. ft. effects surface sterilisation of micro-organisms, we did not proceed beyond the 42 g. tested, but I feel sure that we could have tolerated more. Our clothes were so saturated with phenol at the end of the tests that, on returning home, everyone without prompting or knowing what had been done noticed the strong odour, which was apparent even two hours later.

I am, Sir, yours faithfully,

Greenwich, S.E.10, May 4. R. TANNER HEWLETT.

DOCTORS AND THE PREVENTION OF WAR

THE following statement has been drawn up by the Medical Peace Campaign and signed by Prof. J. A. Ryle, president. It is addressed to members of the medical profession throughout the world.

Realising the suffering and disease which are caused by war, and accepting our medical responsibility to prevent disease as well as to treat it when developed, we urge the governments of the world to take action to make war impossible.

In particular we suggest that, in order to combat the present emergency, Great Britain, France, and Russia should declare that they stand united and determined to resist all further aggression by military force if necessary; and that the governments of these countries should invite all other countries, irrespective of their form of government, to associate themselves with this declaration.

We maintain that the only way to eliminate all possibility of future war is the establishment of the rule of international law, based on the principles of justice to all and backed, so long as this remains necessary, by overwhelming military and economic strength. To this end we urge that a conference be called to discuss the practical measures which should be taken.

Finally, as an organisation representative of medical opinion and regarding medicine as the most international and humane of all professions, we would remind our colleagues in all countries of the great part which they may yet play in influencing public opinion on behalf of peace.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 29, 1939

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 0; scarlet fever, 1616; diphtheria, 816; enteric fever, 26 (27 "expected"); pneumonia (primary or influenzal), 959; puerperal pyrexia, 209; cerebro-spinal fever, 37; acute poliomyelitis, 7; encephalitis lethargica, 4; dysentery, 62; ophthalmia neonatorum, 90. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 5 was 3139, which included: Scarlet fever, 668; diphtheria, 599 (carriers, 22); measles, 10; whooping-cough, 1059; puerperal fever, 13 mothers (plus 7 babies); encephalitis lethargica, 304; poliomyelitis 3. At St. Margaret's Hospital there were 23 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 5 (1) from measles, 4 (0) from scarlet fever, 29 (5) from whooping-cough, 21 (4) from diphtheria, 41 (7) from diarrhœa and enteritis under two years, and 53 (6) from influenza. The figures in parentheses are those for London itself.

Birmingham reported the only death from typhoid. Liverpool had 4 fatal cases of whooping-cough, Manchester, West Hartlepool, Birmingham and Chesterfield each 2. Fatal cases of diphtheria were scattered over 14 great towns, Hull, Birmingham, Derby and Cardiff each reporting 2. Birmingham had 7 deaths attributed to influenza, Liverpool, Lincoln and Swansea each 3.

The number of stillbirths notified during the week was 275 (corresponding to a rate of 40 per 1000 births), including 56 in London.

OPHTHALMIA NEONATORUM IN GREAT BRITAIN

ON April 29, in reporting a discussion on ophthalmia neonatorum held by the International Association for the Prevention of Blindness, we gave figures that may convey a false impression of the prevalence of the disease. We quoted Dr. A. H. H. Sinclair as saying that "the incidence per thousand live births in Scotland ranged between 15·5 *per cent.* and 19·2 *per cent.* in the years 1933 to 1937." The italicised words should not, of course, have been included. So brief a report may also suggest that the figures refer to cases in which there was permanent damage to the eyes; whereas in his report to the association Dr. Sinclair was able to show that during the past five years in Great Britain there has been an average of 50 cases of ophthalmia neonatorum of sufficient severity to impair vision seriously or cause total blindness. The following tables taken from his report show the number of notified cases, the ratio per thousand live births, and the number of cases resulting in partial or total blindness, from 1933 to 1937. In this five-year period 1 child became totally blind in Scotland, 25 in England and 7 in Wales.

SCOTLAND*

Year	Notified cases	Number per 1000 live births	Cases with loss of vision	
			Total blindness	Partial blindness
1933	1472	17·0	—	7
1934	1482	16·7	—	5
1935	1345	15·3	—	5
1936	1379	15·5	—	5
1937	1688	19·2	1	2
ENGLAND†.				
1933	4056	7·0	8	59
1934	4487	7·5	6	30
1935	4369	7·3	7	36
1936	4586	7·6	8	36
1937	5050	8·3	7	31

* From the annual reports of the Department of Health for Scotland.
† Confirmed by the Ministry of Health, London.

POSTGRADUATE COURSES IN GERMANY.—International postgraduate courses in the various specialties will be held in Berlin, Vienna, Hamburg, Cologne, Munich and other German medical centres during the summer of 1939. Further information may be had from the bureau of the Berliner Akademie für ärztliche Fortbildung, Robert Koch Platz 7, Berlin, N.W.7.

OBITUARY

MARGUERITE KETTLE

M.R.C.S.

ASSISTANT EDITOR OF THE LANCET

Mrs. Kettle's death on May 4 means much to many people, for she had a very full life. The following record of it shows the range of her work and gives some idea of the impression she made. Her opportunities were unusual, and her marriage to the late Prof. E. H. Kettle, F.R.S., enriched the lives of both. But her influence did not depend on circumstances so much as on the unsparing use of her many gifts.

She was born on June 2, 1887, at Clapham Park, the younger daughter of Leopold Pam and Philippine née Furth. Her home, in her own words, "was a large rambling house with a garden of a type not now much seen—lilac, acacia, japonica, with a border of lime trees, a hugh mulberry tree with a seat halfway up, a tennis-court just not long enough to have a good run back. There were stables and a landau and a victoria and one horse, latterly hired from Wimbush. Almost any day one's mother drove through Battersea and over Chelsea Bridge into the Park at the Albert Gate in the afternoon, and often one went too on the back seat." She was educated at Queenswood School, then in Clapham Park, as a day-girl. In 1903, before entering for Matric, she was taken away and sent to Madame Yeatman's finishing school at Neuilly, "where there were 70 other English girls so I never learnt French." On her return she took lectures at King's College, under Miss Faithfull the vice-principal, and then experimented—"without success," she tells us—with coming-out and social life. Membership of the Royal Institution and the suffrage campaign were more to her mind, but militant methods caused distress at home, where her father was ill, and she determined to break away and in 1910 went with a brother to South Africa. By this time she had decided to take up medicine, and the reasons for this decision should also be given in her own words:

> "My interest in it started in 1902 when, disliking geography (!), I was allowed to take some logic instead and was thrilled by Jevons and John Stuart Mill, and started studying psychology and ethics with a view to reading for a 'mental and moral' degree. I was profoundly dissatisfied with psychology as then taught (Stout and James) because it seemed to have no physical basis and kept on getting mixed up with pseudo-spiritual values. It seemed certain that the way to approach it must be through physiology. A doctor must know all about the brain cells, and *exactly* what happened when they were actively producing thoughts, so it was obviously necessary to become a doctor and start equipped."

And actually this appreciation of values remained with her; and for long into her medical career she played with the thought of some kind of practice for herself in which her interest in psychology could be turned to good account.

She took the London Matric in South Africa on a correspondence course and returned, reluctantly, in 1913. She entered the London School of Medicine for Women, going on to St. Mary's in 1916 after passing the second M.B. At that period of the war new chances for medical study were open to women and she was in the first group at St. Mary's. Her mind was now mature and she could criticise the contions of medical study—it was a critical time for women—when other students took them for granted.

After qualifying in 1918 she was for a time resident obstetric officer; but in the same year she married Dr. E. H. Kettle. Their home in Nottingham Place became a natural meeting-place for St. Mary's students, past and present, and was the first of the open houses that remained so freely open throughout their married life. For several years "Pam," as she was still called, continued medical work of various kinds at Great Ormond Street and the National Heart Hospital, and for three years she was in charge of the antenatal department at Archer Street. But almost at once she found her real vocation. Work on a child-welfare journal which had then just started gave her an almost fortuitous introduction to the editorial room of THE LANCET and this led to a half-time engagement. The allocation of her time was always difficult. On the one hand she had her home to keep up; and she was not only her husband's companion but his stay and counsellor, in all the stages of his career, at St. Mary's, Cardiff, Bart's, and finally at the British Postgraduate Medical School at Hammersmith. On the other hand she found herself unable to ration her office time if she was to develop to her own satisfaction the ideas that often crowded on her.

One of her early successes was a series of articles on Modern Technique in Treatment, which was republished in four volumes, and she later inspired and took charge of many other series, including the Clinical Interpretation of Aids to Diagnosis, Prognosis, and the Grains and Scruples still with us. This supplementary work should have been enough: it was as much as anyone in her position should have attempted; but when the idea of an inquiry into the recruitment of nurses occurred to her she felt she had no choice but to see it through—until THE LANCET Commission on Nursing was conceived and its report was delivered. Few journalists have opportunities for writing over their own name, and Mrs. Kettle least of all. But the form of this report, the crispness of its message, and the logical sequence of its thought remain the best token of the enterprise, insight, and power of workmanlike execution possessed by the hon. secretary. The natural result of this achievement was her appointment in 1933 by the Ministry of Health as a representative on the General Nursing Council. Apart from this the only substantial paper that she signed was an account of an inquiry into the fate of a population of women medical students, published in these columns in 1936, which illustrated her growing interest in statistical methods.

Though she became a professional writer her outlook never became literary. She had never written for the fun of it, and as a journalist she was always more interested in the fact or the idea than in its presentation. The presentation must be accurate—that was all she cared about. And in seeking precision she came to handle language at least as well as most writers who start with a classical education or a love of writing. She had an eye for fine shades of meaning and could almost always alter a letter or an article to its advantage; on the other hand her own work—though her manuscripts were a chaos—could seldom be improved except perhaps as regards readability and detail. The minor points of "style," punctuation, and spelling she always found an intolerable nuisance; she could not remember the rules, and she thought minute consistency a waste of time. Nor did she really care much what the journal looked like—whether the illustrations were too big or too small, or whether

the articles appeared attractive or not. The journal was not an end in itself: it was an instrument and not a composition; and unlike most journalists she was an executant rather than a would-be composer. Accordingly she had little use for the ingenious stringing-together of words, and colleagues who had taken pains to present a subject freshly were depressed to find how little she thought of any editorial that did not convey "inside information" or authoritative judgment. To the office, as a nominally part-time worker, she came with an external point of view, based on the contacts of her immense acquaintance among practical and busy people—many of them pathologists—who liked facts rather than theories. She never for a moment believed that the truth is revealed to babes, and with a surprising orthodoxy she accepted the views of experts unquestioningly, so long as she believed them to be expert. She had little use for suggestive evidence and still less for suggestive hypotheses; though she could say so with great politeness. She was never impressed by mere novelty.

If as a realist she had a chastening effect on her collaborators she had an immensely stimulating effect on THE LANCET. More and more her function, as a part-timer having less routine to manage, was to prevent monotony and introduce new thought and new ideas. The ideas may not have been more frequent than other people's: the difference was that the moment one was seen it filled her mind. A casual remark in a letter from an aunt would strike her, and she would interrupt everyone's work for a morning while she discussed its implications. Three long (and unescapable) telephone conversations would follow; she would sit up half the night; and next day there would be a leader on her aunt's dilemma, or a scheme for a series of articles that would be useful to her aunt's doctor. She had a very good idea of current demand and by whom it could be met, and when once embarked on a project she carried it through, regardless of obstacles. Everything went down before an "urge"; time and convenience, her own and others', were as naught until it was satisfied. Though in some ways deeply sensitive to the reactions of other people she was prepared to discount them: she would telephone to anybody; and if the anybody was ascertained to be away in the train between Oxford and London that made no difference; the station-master at Reading must comb the train for him and deliver her message. Whatever she did, she did with her whole might, and perhaps the most characteristic thing about her was the infinite trouble she took over the difficulties of her friends. She would spend all her leisure for a month in trying to get someone round a corner, and many will remember how they went to her for a little advice and found themselves thereafter supported by the whole force of a strong nature, and the skill of an experienced diplomatist. Emotionally she was one of those who continually radiate instead of absorbing; she was unshockable, and her standard of loyalty was the highest. Unhappily her capacity for giving and doing went with an incapacity for accepting and resting. Apart from clever clothes, a little *dégagé* housekeeping, Wagner at Covent Garden, and an occasional novel she had few interests outside medicine, social life, and the complicated personal problems so often put before her. She lived, somewhat conventionally, in her own age and her own urban environment: she was neither a historian nor a gardener; and at times when her age and environment could offer little she had few possessions in reserve elsewhere.

Mrs. Kettle's outstanding personal work—the attempt to improve conditions of nursing—was, as we have indicated, a by-product of her journalism. The small idea was sown and took root as usual in the day's routine, but grew so rapidly that her chiefs soon found themselves committed to an enterprise occupying most of her time (and some of theirs) for eighteen months. By this she was revealed to a larger circle as a reformer of remarkable power. Never a theorist, and wholly unsentimental, she was nevertheless a progressive; she had both feet on the ground and a politic approach, but yet a spirit that was indomitable so long as an end was in view. Her resemblance to Florence Nightingale—the Miss Nightingale who harassed the War Office for half a century—was made more conspicuous by the chance that brought her to work for nurses. But there were many other objects to which she devoted the same intelligence, sense, and fearlessness.

The Kettles had no children, and from the strain of her husband's illness Mrs. Kettle never fully recovered. She resumed her work at THE LANCET, though it was interrupted by ill health and unfruitful holidays. She tried to take up the threads of her life where they had been broken, and attended governors' meetings at Queenswood School and St. Helen's, Northwood, and council meetings of the London and Counties Medical Protection Society. A week or two ago she was at the annual conference of the Medical Women's Federation, of which she was a vice-president; and she shared as usual in producing last week's issue of THE LANCET. But her work, though its standard and even its brilliance was maintained, was too expensive in effort; and she could never be convinced that recovery was coming.

FROM A FELLOW STUDENT

Craggs writes: I lived and worked with Pam during her student days. One of our first jobs together was learning bones, and right at the beginning came the statement in Gray's Anatomy that we should look for an "eminence sometimes a depression." Pam's logical mind was outraged at this vagueness: either it was one or the other, or if all this stuff was uncertain what was the good of trying to learn it? The phrase remained a catchword for years among us to describe any uncertainty whether of daily life or medical matters. She was then living in rooms at Hunter Street over the school where she was visited by students and staff; even the domestics chose her to take their troubles to. It was a time when attempts were being made to obtain admission for women to hospitals other than the Royal Free and her advice was always sought in these negotiations though her wider and saner outlook was not always palatable to the more militant. She was with the first twelve women to enter St. Mary's in 1916 and again her wisdom was invaluable to us during the inevitable friction of the start. Within the first few weeks the women were asked to leave a demonstration and it was suggested that, following suffragette principles, we should stay until removed. Pam persuaded us to depart peaceably and arranged the whole affair satisfactorily for us through the dean. At St. Mary's, without losing touch with her old friends, she knew staff and students. Seldom can any woman have received more confidences, or been admitted more frequently to the inner history of any happening. She seemed not to realise how much greater were her intellectual powers and personality than those round her, and having no desire for leadership she never knew how much she was a leader.

As a student her methods of work, though they gave results—she never failed at any examination—were incomprehensible to those trained in the usual note-book tradition. She would be found any evening seated on the floor before the fire, the carpet littered with books and papers. This was partly due to her acknowledged sin of untidiness, but also to a method of work we nicknamed "retropulsion." Dealing for instance with a disease of the stomach she would go back from its clinical aspect to its pathology, history, anatomy and physiology and —according to us—its embryology and evolution as well. It was necessary to her to understand wholly what she was reading from the beginning. But always the uncertainties of medicine bothered her; if she had difficulty with a case she believed it due to her own inefficiency. This lack of confidence would have handicapped her in clinical practice. Without doubt she found her vocation in journalism.

CAPACITY FOR FRIENDSHIP

Lord Balfour of Burleigh writes: The adjective which best fits Pam Kettle is genuine; she was real through and through, there was nothing sham or artificial or affected in her composition or in her outlook. Therein perhaps lay the secret of her unlimited capacity for friendship with all sorts and conditions of men and women. She combined a keen critical faculty, fostered by her training in medicine, and developed by years of analytical and constructive work for THE LANCET, with a kindness of heart as discriminating as it was inexhaustible. She was the ideal confidante and helped many a lame dog over his stile or along a road which would have been too hard for him unaided. No-one ever came to her in vain for help either in personal difficulties or on practical sociological problems. She brought to every question the same informed enthusiasm; she had a gift for directing into fruitful channels the zeal of the uninstructed, which would otherwise have run to waste. The effort to provide anæsthetics in childbirth was greatly helped by her; she was interested in better housing for the poor long before its social value was generally recognised, and she was always helpfully constructive in discussion and furtherance of these and all other social reforms. No trouble was too great if the effort could contribute towards making this world a better place. Her mainspring was her devotion to her husband and his to her; to say that she never got over his death is a faint reflexion of the truth. They were so completely members of one another that their separation was a blow like the severance of a vital part. A host of friends both of higher and of lower degree will mourn her passing; her place in their hearts will never be filled.

Dr. A. H. T. Robb-Smith writes: To many Mrs. Kettle's death is not only a great personal loss but a break in a traditional hospitality in the Oslerian style. While the late Prof. Kettle was at St. Bartholomew's Hospital, their house in Holland Park was another "Open Arms" where one would meet a happy medley of distinguished clinicians and pathologists, junior demonstrators and members of the football teams, skilfully attuned by their delightful hosts, while the dachshunds Pride and Prejudice added to the gaiety. At other times one would join in their quiet family life and it was after such occasions that many would come away the better for both good conversation and advice. When Prof. Kettle went to the Postgraduate School this bonhomous atmosphere was maintained though marred all too soon by his ill health, and in the months before his last illness Mrs. Kettle very gently and unobtrusively saved him many worries and fatigues. After her great travail she bravely continued in the old manner and we would see her at tea at the London meeting of the Pathological Society, eager to inquire of all that was happening both to individuals and in matters pathological. One was always sure of a welcome at her home and there find young and old sharing pleasurable conversation and seeking comfort and advice from one whose heart was eaten with sorrow.

THE WOMAN'S MOVEMENT

Mrs. Oliver Strachey writes: The death of Dr. Marguerite Kettle is a true loss to all who knew her, not only to them but to many who only knew of her work, and to many still to come who will not even know that she lived. For she was one of those who are useful to their fellows, and whose influence lives after them. Her interest in the woman's movement, and her belief in its value to the whole community were practical things, expressed in hard work and daily life; and in putting her abilities and her energies at the service of the nursing profession she did good which is as yet impossible to measure. She was the hon. secretary and the moving spirit in THE LANCET Commission on Nursing, and her work for that report led on to her appointment to the General Nursing Council. The findings of the commission were not, indeed, immediately accepted, and some of them were, and still are, vigorously debated within the profession. But the effect of the report was far-reaching. The stir of outside influence and of modern methods of investigation was brought to bear upon this great women's profession, and the results are not yet in sight. In all the mass of her detailed work for nurses, Dr. Kettle showed unwavering idealism. She was practical and realist at all times, avoiding theory and accepting compromise. But she never forgot the basis which inspired her—namely, her belief that women's work in the world was of value to the world. In medicine and in nursing she knew the conditions of their work; and she was sure that only good would come from every advance, whether in status, or in pay, or in public esteem. She was one of those whom Florence Nightingale would have called "A Saviour," and her work lives after her.

THE REFORMER AT WORK

Dr. Margaret Jackson writes: When she was secretary of the Commission on Nursing she seemed to foresee the pattern of the inquiry not in terms of single items but as a growing whole. Her grasp and precision informed the entire plan and she was tireless even at those points where dull routine work was heavy. She naturally felt warm sympathy with nurses, but she never allowed the critical side of her mind to be governed by the partisan. I think she never made a hasty judgment, and her balanced opinion was accepted as a guide in every discussion. As though in protest against this stern intellectual discipline she displayed an engaging untidiness in other ways. The morning I arrived in the office she led me to her desk, invisible beneath a fine harvest of papers. "I am not tidy," she remarked; "I have other virtues." But she managed to keep even her untidiness under her own control. She used to put all relevant papers into a large suit-case which journeyed about with her wherever she went at that time. When some memorandum or other was wanted it could always be found—at the cost of a hunt through the bag.

The searcher was apt to find the vital document keeping strange company—an apple, some loose change, several pairs of gloves, snatched up at random on successive days, and packets of sandwiches going back even further, provided by her anxious cook and neglected by the recipient.... While the commission was sitting she worked as relentlessly at home as she did in the office. She was devoured by the task, as an artist is devoured by the picture he is painting.

NURSING

Mr. H. L. Eason writes: Dr. Kettle was appointed to the General Nursing Council in 1933 as a representative of the Ministry of Health. Her appointment was the almost inevitable consequence of the work she did in connexion with THE LANCET Commission on Nursing from 1930 to 1932. She served on the education committee of the council in 1934, 1935, 1936, 1937, and 1939, and in committee she was exceptionally useful and efficient. Devoted to the welfare of nurses and to their primary and higher education, she used all her gifts to this end. She knew what she wanted, made her points and was a sturdy fighter for her cause. But despite her definite, clear-cut views, Mrs. Kettle could not make an enemy as she had a charming manner and her disinterestedness was apparent. The nursing profession have lost a good friend and the General Nursing Council a valued member.

Miss E. E. P. MacManus (matron of Guy's Hospital) writes: I first made Mrs. Kettle's acquaintance in 1931 when she and other members of THE LANCET Commission on Nursing attended a meeting at the College of Nursing in order to gain information on a number of points connected with a nurse's life and training in hospital. We were immediately attracted to each other, and our acquaintance ripened into a friendship which, although it had few opportunities for enjoyment, lasted until the present time. On her appointment next year to represent the Ministry of Health on the General Nursing Council she took a keen interest in the education of nurses and became a member of its education committee. She was an ardent supporter of the policy of the split preliminary state examination in order that nurses should be able to take the first part while still at school. Although at first this policy was not accepted, she gave much time, thought and hard work to it, and it was a pleasure to her to see it adopted by the council at a later date. She believed it to be a real advance in methods of nursing education. In committees she combined a quiet persistence with a very gentle manner. She was a charming hostess and many people will be the poorer by her loss.

MEDICAL PROTECTION

Mr. G. F. Stebbing writes: Dr. Kettle's death will be a serious loss to the medical profession generally, but I should like to say how much she will be missed by the council of the London and Counties Medical Protection Society. When Sir Squire Sprigge was unable to be present at the council meetings Dr. Kettle was appointed in his stead. Her wide knowledge of medical affairs and her shrewd business sense were always available to the council and greatly appreciated by its members. Her words were few but always to the point, and her friendly manner made even hostile criticism seem welcome. We knew that we could rely upon her for any help that she could give at any time, and had learned that we need never have any hesitation in asking for such help even when it meant considerable trouble to her.

SCHOOL GOVERNOR

Lord Stamp writes: As chairman of the governors of Queenswood School, I speak of an important aspect of Dr. Kettle's life of which little may be known in the professional circles in which she moved. She entered Queenswood when nine years old and was there for some seven or eight years. Miss Trew, the headmistress, records that she always showed ability far above the average and was soon at the top of every form into which she went, for she was keen, alert and had great powers of concentration. She did not leave her mark on the examination roll because it was her parents' wish that she should not take exams. After leaving school in France, Dr. Kettle went to Johannesburg to keep house for her brother and was there seized with a desire to take up the medical profession, and she wrote to the headmistress for the matriculation syllabus and all the books. She worked entirely on her own in South Africa and passed matric at her first attempt. After that she came home to study medicine, and others will tell the story of her subsequent career. Dr. Kettle kept a vivid and practical interest in her old school and joined the governors in 1932. She was worthy of her place in any of many capacities. First, as a representative of the most eminent of old scholars, with a knowledge of the school traditions and keen ambitions for its future. Second, because of the unique place she had made for herself as a woman in public affairs. Third, because of her personal qualities of sympathy, humour and practical interest in education. All the circles in which she moved will miss her greatly, but none more than Queenswood.

THE LANCET 100 YEARS AGO

May 11, 1839, *p.* 262.

From a leading article on a pamphlet by Sir ANDREW HALLIDAY.

The following is an hypothesis in which Dr. ADDISON *might have gloried* at the famous debate on malaria:—"As regards the marsh-poison itself, and the question so often asked, What is it? I can only, like others, offer a conjecture, which is this: I consider that, at particular seasons, or under peculiar influences, certain living *essences* are called into existence, which, floating in the atmosphere, are swallowed in myriads, and dissolving in the stomach, poison the vital fluids; that, in proportion to the ravages committed upon these fluids we have the phenomena of fever more or less developed."—The *essences* are called *invisible but active insects*, in the next page.

FINCHLEY'S NEW HEALTH CENTRE.—Finchley borough council's centre in Oak Lane was declared open on May 6 by Mr. R. H. Bernays, parliamentary secretary to the Ministry of Health. The centre was designed by Mr. P. T. Harrison, the borough engineer and architect, in consultation with Dr. A. A. Turner, the medical officer of health, and cost £10,000 to erect. The building is on two floors, the ground floor being allotted to maternity and child welfare and the first floor to school clinics. On the ground floor is a large waiting hall leading to rooms for the infant-welfare centre and antenatal clinic and a nursery for children under school age. Above these is accommodation for the ophthalmic, artificial-sunlight and minor ailments clinics for school-children, and two dental surgeries with recovery- and rinsing-rooms. In his speech at the opening ceremony Mr. Bernays remarked on the energy with which Finchley was tackling the difficult problem of public-health administration in a rapidly growing area. In the new premises, he said, it would be possible to combine the facilities for mothers and young children with those for children of school age, and it would be a great help in attaining continuity of supervision to have the responsibility for children of both age-groups in the hands of the same medical officers.

MEDICAL NEWS

University of Cambridge

Particulars of an E. G. Fearnsides scholarship for clinical research on the organic diseases of the nervous system will be found in our advertisement columns. The scholarship is open to graduates and titular graduates of the university.

University of London

At a meeting of convocation held on May 9 Sir Ernest Graham-Little, F.R.C.P., was re-elected to represent medicine on the senate. At the same time Prof. M. Greenwood, F.R.C.P., F.R.S., and Prof. G. B. Jeffery, D.Sc., F.R.S., were re-elected to represent science. Prof. Jeffery was elected deputy chairman of convocation.

University of Dublin

Dr. C. Heymans, professor of pharmacology in the University of Ghent, is to deliver two John Mallet Purser lectures at the school of physic, Trinity College. On May 17 he will speak on the regulation of blood-pressure and vasomotor tone, and on May 18 on the rôle of the cardio-aortic and carotid sinus nerves in the reflex control of the respiratory centre.

University of Edinburgh

Mr. A. L. Bacharach will give a lecture on vitamin E in the University New Buildings on Tuesday, June 6, at 5 P.M. Graduates and students are invited to attend.

Royal College of Physicians of Edinburgh

A meeting of the college was held on May 2, with Dr. Alexander Goodall, the president, in the chair. Dr. John Gordon Kininmonth (Edinburgh) and Dr. Alexander Colin Patton Campbell (Edinburgh) were introduced and took their seats as fellows of the college. Dr. Sarandindu Mohan Ghosal (India), Dr. Amulyaratan Chakravarti (India), Dr. Thomas Arthur Howard Munro (Colchester), and Dr. Hugh Adair Raeburn (London) were elected to the fellowship. The Freeland Barbour fellowship was awarded to Dr. Edith Dawson.

The Morison lectures for 1939 will be delivered by Dr. Henry Yellowlees in the hall of the college on Thursday and Friday, June 8 and 9, at 5 P.M. His subject is the problem of adolescence.

Research in Tropical Medicine

The Medical Research Council issue the following information about fellowships :—

Up to three *junior fellowships* are offered immediately to medical men or women wishing to receive training for research in tropical medicine. Preference will be given to candidates who have had experience of methods of research in some branch of medical science. The fellowships will be tenable for three years, the first to be spent at a school of tropical medicine, the second at the same or some other institution at home, and the third at some centre in the tropics. The stipend will be £300, £400, and £500 per annum in the successive years, with an additional allowance during service abroad, and necessary expenses.

Senior fellowships.—In three years' time at least one senior fellowship will be available for candidates who have held the junior fellowships. This will be awarded for a further three years, with a stipend of £600–£750 per annum, and allowances. The council are also prepared to consider immediate applications for senior fellowships from candidates who have had adequate experience in research, whether already specially trained in tropical medicine or not.

The council further intend to establish in due course permanent and pensionable appointments for research in tropical medicine, including senior posts. Members of this research staff will work partly in the tropics and partly in institutions at home. Inquiries may be addressed to the secretary, Tropical Medical Research Committee, 38, Old Queen Street, London, S.W.1, with whom applications should be lodged not later than June 19.

Committee against Malnutrition

A public meeting will be held by this committee on Thursday evening, May 18, at 8 o'clock in the hall of the Royal Society of Arts, 18, John Street, Adelphi, London, W.C.2, when there will be a discussion on the health and nutrition of the peoples of India. Sir Cuthbert Sprawson will be in the chair and speakers will include Sir John Megaw, Dr. Margaret Balfour, Dr. Dagmar Wilson, and Prof. N. Gangulee, Ph.D. Tickets may be had from the offices of the committee, 19c, Eagle Street, W.C.1.

St. John's College, Cambridge

Prof. Ross Harrison, chairman of the National Research Council of the United States, will deliver the Linacre lecture in the lecture room of the anatomy school on Tuesday, May 16, at 5 P.M. He will speak on the development of the internal ear — a study in experimental embryology.

London Jewish Hospital Medical Society

Sir Charles Wilson will deliver the annual oration to this society on Sunday, May 14, at 9 P.M., when he will speak on humility. The meeting will be held at 5, Addison Road, W.14.

West London Medico-Chirurgical Society

At 8.30 P.M., on Thursday, June 8, at the Kensington Town Hall, Prof. J. B. S. Haldane, F.R.S., will deliver the Cavendish lecture to this society. He will speak on congenital disease.

Royal Microscopical Society

On Wednesday, May 17, at 5.30 P.M., at B.M.A. House, Tavistock Square, London, W.C.1, Mr. F. C. Bawden will address this society on some properties of plant viruses.

Silicosis Conference

The fourth Silicosis Symposium will be held from June 19 to 23 at the Saranac Laboratory, Saranac Lake, N.Y. The subjects for discussion will include : disability, its causes and clinical evaluation ; classical silicosis and reaction to mixed dusts. Further information may be had from Dr. L. U. Gardner, director of the laboratory.

Indian Medical Service

The annual dinner will be held at the Trocadero Restaurant, London, W.1, on Wednesday June 14, at 7.15 P.M., when Major-General C. W. F. Melville will preside. Tickets may be had from Major Sir Thomas Carey Evans, the hon. secretary, Hammersmith Hospital, Ducane Road, W.12.

Left Book Club Medical Group

At a meeting of this group to be held at 101, Great Russell Street, London, W.C.1, on Thursday, May 18, at 8.30 P.M., Prof. H. Levy will give a talk entitled Science and Antisemitism. The meetings of the group are open to medical men, pharmacists, nurses, and members of all allied professions, and their friends.

Dentists and National Service

A central emergency committee was set up some time ago to compile a register of all dentists who are ready to place their professional services at the Government's disposal in time of war, and local emergency committees on which all professional interests are represented have now been organised in the 40 districts covering the whole of England and Wales. These local committees are helping the central body in its task of assessing national and local needs for dental service in the event of war, and insuring that all available personnel shall be used to the best advantage. The secretary of the dental emergency committee may be addressed at 13, Hill Street, London, W.1.

Sanitary Problems in an Emergency

The evacuation of civilians in an emergency from certain areas is likely to raise problems of health in the billeting areas or in the special camps that may be set up to receive them. To assist the health authorities of the reception areas the council of the Royal Sanitary Institute have arranged for a series of lectures and demonstrations to be given dealing with sanitary problems of evacuation of the civilian population. The lecturers will be Major-General Sir Wilfred Beveridge, a former director of hygiene of the Army Medical Service, and Mr. H. H. Clay, of the London School of Hygiene. The lectures will be given at the institute, 90, Buckingham Palace Road, London, S.W.1, from June 19 to 23. A visit will be made to the Army School of Hygiene at Aldershot. The course will be open to members and associates of the institute without fee.

Fellowship in Cancer Research

Applications are invited for a Pilkington fellowship in cancer research which is of the value of £300 and is tenable for one year. Further information may be had from the registrar of the University of Manchester.

London County Council

At a meeting of the council on May 9 it was decided to ask the Minister of Health to investigate certain statements affecting the administration of St. Charles's Hospital in connexion with the deaths of 20 children.

Medical Aspects of Delinquency

A week-end lecture course for doctors on this subject will be held at the Institute for the Scientific Treatment of Delinquency, 8, Portman Street, London, W.1, on June 3 and 4. Further particulars will be found in our advertisement columns.

Bristol's New Mental Hospital

On May 3, Sir Laurence Brock, chairman of the Board of Control, opened the new mental institution which has been built by the city of Bristol at Barrow Gurney. The hospital which is arranged on the villa system will, it is intended, ultimately house 1150 patients; at present there is accommodation for 375. The early and acute stages of mental disease will be cared for in the admission and treatment centres; patients will afterwards pass on to the convalescent villas and later to the parole villas. The gardens of the estate are well laid out, provision has been made for farm buildings, and there is a recreation ground. The architect is Sir George Oatley, who prepared the plans of the hospital in consultation with Dr. Barton White and the Board of Control.

Scottish Hospitals in War-time

The casualty hospitals in Scotland in the event of war will be organised in three groups. The first group will be restricted largely to giving emergency treatment; the second will treat any casualties in their immediate vicinity and will also give continued treatment to cases transferred from the first group; and the third will deal with patients whose treatment does not require special facilities. In addition to these hospitals, mansion houses in country districts will be used to provide auxiliary accommodation. The Department of Health for Scotland, which has been entrusted with the task of preparing and developing the necessary plans, has divided the country into five areas—western, south-eastern, eastern, north-eastern, and northern—each under the charge of a hospital officer. In an emergency, however, hospital authorities will retain full responsibility for the management of their hospitals, and will be expected to carry on the essential minimum of their normal work. It is not proposed to abandon any hospital. The maximum use is to be made of available accommodation by restricting admission to urgent cases, by erecting beds which hospitals normally maintain in reserve, by sending patients home, by introducing additional beds in the wards, by converting spare rooms into wards, by transferring patients from the first two groups to the third, and by erecting temporary buildings. Hospital authorities are urged to maintain reserves of consumable stores and a minimum of at least a month's normal supply is mentioned.

With regard to personnel, the aim will be to staff hospitals in the most dangerous areas on a "casualty" basis, the senior and more experienced consultants and specialists being assigned to the outlying hospitals. Arrangements are being made for the organisation of surgical teams to serve hospitals: some of the teams will be specially constituted to deal with certain types of injury—e.g., head wounds—while others will be mobile, so as to be available at any point where exceptional pressure occurs. A register of all medical men and women who would be available in an emergency is kept by the Scottish Central Emergency Committee and a similar register of trained and assistant nurses by the Scottish branch of the College of Nursing. In war-time each hospital authority will submit daily reports to the hospital officer, and in every period of raiding they will inform him every two hours of the bed state of the hospital and warn him whenever the balance of available beds threatens to become exhausted.

British Postgraduate Medical School

On June 2 Mr. Charles Donald will give the first of three weekly lectures on acute pyogenic infections. He will speak at 2.30 P.M. in the department of surgery. On June 7, 14, and 21 at 4.30 P.M., in the department of pathology, Prof. H. W. C. Vines will lecture on the pathology of the adrenal glands. Further information may be had from the dean of the school, Ducane Road, London, W.12.

Nurses in War-time

At the College of Nursing on May 5 the Minister of Health outlined the Government's plans for meeting the need for additional nurses in war-time. By discharging patients or transferring them to other institutions, by crowding the beds, and by erecting temporary hutments and the like it is hoped to make 200,000 hospital beds available for casualties within twenty-four hours and a further 100,000 within a week. The construction of annexes is expected to provide another 50,000 beds. Sufficient staff is available for only 200,000 beds, and nurses must be found for the other 150,000. The first step, Mr. Elliot said, will be to make the most thorough use of existing personnel. In order to minimise the demands made by military mobilisation the War Office has undertaken to mobilise only a proportion of the hospitals that exist in plan as part of the mobilisation scheme, and in return the existing hospitals will admit without distinction either civil or military casualties. Secondly, there will have to be a considerable re-location of staffs in accordance with the scheme whereby casualties will be treated not in the central hospitals of the great cities but further out. Thirdly, the Central Emergency Committee for the Nursing Profession is compiling a register of the skilled, fully trained nurses not at present employed in hospitals or other institutions, and is arranging for the recruitment of thousands of auxiliaries. This register will be the more necessary, said the Minister, because the need for nursing personnel does not by any means end with the staffing of the hospitals. There will also be some 3000 first-aid posts, and the ordinary peace-time services would have to be kept going, being especially required in areas where the population is increased under evacuation schemes. Some 15,000 trained nurses are known to have retired from active practice, but it is estimated that at least 100,000 auxiliaries will be needed.

Medical Diary

May 15 *to May* 21

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

TUESDAY.—5 P.M., meeting of fellows.

WEDNESDAY.

Surgery. 8.30 P.M., annual general meeting. Mr. Claude Frankau: The Problems of Surgery in Old Age (presidential address).

THURSDAY.

Dermatology. 4 P.M., Dr. F. Parkes Weber: (1) Rendu-Osler Type of Telangiectatic Dysplasia and De Morgan's Spots, (2) Progressive Diffuse more or less Symmetrical, Telangiectatic Dysplasia. Dr. H. Semon and Dr. F. Herrmann: (3–6) Acne Vulgaris. Dr. Mitchell Heggs: (7–8) Arborescent Telangiectasis Treated with Grenz-ray. Dr. C. H. Whittle: (9) Lesion on Lip. 5 P.M., annual general meeting.

Neurology. 8 P.M., slides and specimens. 8.30 P.M., annual general meeting.

FRIDAY.

Obstetrics and Gynæcology. 8 P.M., annual general meeting. Mr. Albert Davis: Diagnostic Value of Hysterography in Gynæcology. Prof. F. J. Browne: Danger of Willett's Forceps in Placenta Prævia. Mr. G. F. Gibberd: Factors Influencing the Attitude of the Fœtus in Utero. Mr. J. H. Peel: Persistent Menstruation until the Age of 71; Effects of Stilbœstrol on Labour. Mr. J. St. George Wilson: film of the Liverpool Quadruplets; colour film of the Operation of Sturmdorff's Amputation of the Cervix with the Diathermy Cautery. Prof. Browne: Full-time Ectopic Pregnancy (girl now aged 12).

Radiology. 7 P.M., annual general meeting.

SATURDAY.

Psychiatry. 2.30 P.M., clinical meeting at St. Ebba's Hospital, Epsom, Surrey.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1.

THURSDAY.—8.15 P.M., Dr. H. M. O. Lester (Nigeria): Trypanosomiasis in some African Dependencies.

TUBERCULOSIS ASSOCIATION.
FRIDAY.—5.10 P.M. (26, Portland Place, W.1), Dr. J. G. Scadding and Dr. G. Ivor Davies: Diagnosis of Pulmonary Tuberculosis in the Absence of Bacteriological Confirmation—Clinical and Administrative Difficulties. 8.10 P.M., Dr. T. W. Davies: Silicosis in Slate-quarry Miners.

CHELSEA CLINICAL SOCIETY.
TUESDAY.—8.30 P.M. (Rembrandt Hotel, Thurloe Place, S.W.7), Mr. G. N. M. Tyrrell: The Scientific Aspect of Psychical Research.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY, Royal Northern Hospital, Holloway Road, N.7.
WEDNESDAY.—9 P.M., Sir Alexander Maxwell: Treatment of Crime.

HEBERDEN SOCIETY.
TUESDAY.—8.30 P.M. (11, Chandos Street, W.1), Dr. Ernest Fletcher: Osteo-arthritis and its Association with Obesity and Hypertension. (Heberden lecture.)

EUGENICS SOCIETY.
TUESDAY.—5.15 P.M. (rooms of the Royal Society, Burlington House, Piccadilly, W.1), Prof. A. M. Carr-Saunders: Some Problems of Population.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1.
THURSDAY.—5 P.M., Prof. J. A. Ryle: Visceral Neuroses. (First Croonian lecture.)

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.
MONDAY.—5 P.M., Lord Horder: The Control of Disease. (Frederick Price lecture.)

ROYAL SOCIETY OF ARTS, John Street, Adelphi, W.C.2.
MONDAY.—8 P.M., Prof. E. C. Dodds: Modern Chemistry, Modern Medicine, andj Modern Food. (Second Cantor lecture.)

TAVISTOCK CLINIC, Malet Place, W.C.1.
MONDAY.—6 P.M., Dr. Emanuel Miller: Theories of Instinct (II).
WEDNESDAY.—3 P.M., Dr. Cedric Shaw: Cardiovascular Syndromes. 4.30 P.M., Dr. H. Crichton-Miller: Hysteria.
THURSDAY.—6 P.M., Dr. Grace Calver: Methods of Diagnosis and Therapy.

INSTITUTE OF PSYCHO-ANALYSIS, 96, Gloucester Place, W.1.
TUESDAY.—8.30 P.M., Dr. E. Bibring: Domination and Subordination.

CHARTERHOUSE RHEUMATISM CLINIC, 56, Weymouth Street, W.1.
WEDNESDAY.—8.30 P.M., Mr. J. S. Ryan and Dr. Raymond Greene: Endocrine Aspect of Rheumatism. Dr. H. Warren Crowe: film on Postural Exercises. Dr. S. Gilbert Scott: film on Spondylitis.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
MONDAY.—4.30 P.M., Dr. R. C. Wingfield: Pulmonary Tuberculosis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Prof. J. H. Dible: The General Pathology of Syphilis. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. A. A. Miles: The Isolation of Bacterial Antigens.
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Mr. Victor Bonney: Benign Uterine Neoplasms.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Cecil Joll: Toxic Goitre.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

ST. MARY'S HOSPITAL, W.2.
TUESDAY.—5 P.M. (institute of pathology and research), Mr. A. S. Parkes, F.R.S.: The Hormones of the Anterior Pituitary Body.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, W.C.1.
THURSDAY.—2 P.M., Dr. Ruby Stern: Virus Infections of the Central Nervous System in Children. 3 P.M., Mr. H. C. Apperly: The Milk Teeth.
Outpatient clinics daily at 10 A.M. and ward visits at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.1.
THURSDAY.—5 P.M., Dr. W. Mayer-Gross: psychiatric demonstration.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2.
MONDAY.—5 P.M., Dr. J. A. Drake: Dermatological Neuroses.
TUESDAY.—5 P.M., Dr. J. E. M. Wigley: Napkin-area Eruptions.
WEDNESDAY.—5 P.M., Dr. I. Muende: pathological demonstration.
FRIDAY.—5 P.M., Dr. R. T. Brain: Physiotherapy.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
MONDAY to SUNDAY.—ST. PETER'S HOSPITAL, Henrietta Street, W.C.2, all-day course in urology.—ST. JOHN'S HOSPITAL, 5, Lisle Street, W.C.2, afternoon courses in dermatology. (Open to non-members.)—BROMPTON HOSPITAL, S.W.3, Tues. and Fri., 5.15 P.M., M.R.C.P. course in chest diseases.—ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh Road, S.W.1, Sat. and Sun., course in physical medicine.

MANCHESTER ROYAL INFIRMARY.
FRIDAY.—4.15 P.M., Dr. D. M. Sutherland: demonstration of surgical cases.

Appointments

BROWNE, JAMES, M.B. Belf., junior assistant medical officer at Botleys Park Colony, Chertsey.
CLARK, J. F., L.R.C.P.E., assistant resident medical officer at Holgate Municipal Hospital, Middlesbrough.
DUNSCOMBE, N. D., M.B. Camb., D.P.H., barrister-at-law, medical officer of health for the Stroud urban and rural districts and Nailsworth urban district.
GILL, A. M., M.D. Lond., M.R.C.P., assistant physician to the West London Hospital.
HALLETT, C. V., M.B. Melb., assistant medical officer (class II) at St. Pancras Hospital (L.C.C.).
HART, A. TUDOR, M.R.C.S., assistant county medical officer of health (A.R.P.) for Kent.
HARWOOD, H. F., M.B. Lpool, resident assistant medical officer, Clatterbridge Isolation Hospital.
HEASMAN, H. W., M.R.C.S., assistant district medical officer for L.C.C. area IV, district D (part St. Marylebone and part Paddington).
KIDSON, C. W., M.B. Birm., assistant school medical officer for Huddersfield.
MCLAREN, J. W., M.R.C.S., D.M.R.E., senior radiologist at St. Thomas's Hospital, London.
MARSHALL, JAMES, M.B. Glasg., D.P.H., assistant county medical officer of health for Kent.
MELLER, H. K., M.B. Camb., M.R.C.P., outpatient medical registrar at the Hospital for Sick Children, Great Ormond Street, London.
ORLEY, ALEXANDER, M.D. Geneva, M.R.C.S., D.M.R.E., hon. radiologist to the Paddington Green Children's Hospital, London.
PULVERTAFT, C. N., M.B. Camb., D.M.R.E., senior assistant radiologist at the Royal Cancer Hospital (Free), London.
REDMAN, THIRZA, Ph.D. Lond., M.B. Lpool, D.P.H., pathologist and research fellow in pathology at the Christie Hospital and Holt Radium Institute, Manchester.
REES-JONES, G. F., M.R.C.S., chief clinical assistant in the X-ray (diagnostic) department of the West London Hospital.
RICHARDS, FLORENCE G., M.R.C.S., D.R.C.O.G., outpatient medical registrar at the Hospital for Sick Children, Great Ormond Street, London.
ROBERTS, F. W., M.B. Lond., D.A., hon. anæsthetist to the Middlesex Hospital, London.
SEILER, H. E., M.D. Glasg., D.P.H., deputy medical officer of health for Edinburgh.
SPARKS, J. V., M.R.C.S., D.M.R.E., part-time radiologist at the Royal Cancer Hospital (Free), London.
TODD, J. W., M.B. Lond., M.R.C.P., resident medical officer at the Middlesex Hospital, London.
TOMLIN, E. H., M.B. Leeds, D.P.H., assistant medical officer of health for Plymouth.
WALLACE, H. J., M.B. Camb., M.R.C.P., hon. physician to the skin department of the Paddington Green Children's Hospital, London.
WHEATLEY, J. N., L.M.S.S.A., assistant medical officer (A.R.P.) for Hornsey.
WISEMAN, J. F. S., M.B. Edin., medical officer at Cornwall Works Dispensary, Smethwick.

Colonial Service.—The following appointments are announced:—
GROVE-WHITE, R. J., M.B. Dubl., medical officer, Malaya;
MACBETH, R. I., M.R.C.S., medical officer, Malaya;
MACKAY, R., M.D. Aberd., D.P.H., specialist, medical department, Tanganyika Territory; and
ROSTANT, C. F., M.B. Edin., medical officer, district services, Trinidad.

Vacancies

For further information refer to the advertisement columns

Basingstoke, Hants, Park Prewett Mental Hosp.—Jun. asst. M.O., £350.
Bermondsey Borough.—Asst. M.O., £600.
Birmingham, Canwell Hall Babies' Hosp.—Res. M.O., at rate of £250.
Blackburn County Borough.—Asst. M.O.H., £600. Also jun. asst. M.O. at Queen's Park Hosp., &c., £200.
Bolton Royal Infirmary.—H.P., at rate of £200. Also three H.S.'s, each at rate of £150.
Brighton, Royal Sussex County Hosp.—H.P. and cas. H.S., at rate of £150 and £120 respectively.
Brighton, Sussex Eye Hosp., Eastern Road.—H.S., at rate of £150.
Bristol, Walker Dunbar Private Hosp., &c., Clifton.—Vacancy on hon. med. staff.
Bristol University.—Part-time medical officers.
Cambridge University.—E. G. Fearnsides scholarship for clinical research, &c.
Canterbury, Kent and Canterbury Hosp.—H.P., at rate of £125.
Central London Throat, Nose and Ear Hosp., Gray's Inn Road, W.C.1.—Hon. second asst.
Chelsea Hosp. for Women, Arthur Street, S.W.3.—Jun. H.S. (Male), £100. Also medical officer for convalescent home, St. Leonard's-on-Sea.
Chesterfield and North Derbyshire Royal Hosp.—H.S. to ophth. and ear, nose and throat dept., at rate of £150. Also H.S. and asst. cas. O., at rate of £150.
Colchester, Essex County Hosp.—H.P., £150.
Colchester, Royal Eastern Counties' Institution, &c.—Asst. M.O., £400.
Derby, Derbyshire Royal Infirmary.—H.S. for general surgery, £150.

*Evelina Hosp. for Sick Children, Southwark, S.E.*1.—H.P., at rate of £120.
*Finsbury Metropolitan Borough, E.C.*1.—Temp. tuberculosis officer, £50 per month.
Hackney Borough Council.—Consultant gynæcologist (part-time), 2½ guineas each attendance.
Halifax Royal Infirmary.—First H.S., at rate of £200.
*Hampstead General Hosp., Haverstock Hill, N.W.*3.—Res. cas. surg. O. for outpatient dept., at rate of £100.
Hertford County Hosp.—Hon. consulting physio-therapeutist to dept. of physical medicine. Also H.S., at rate of £200.
*Hosp. for Sick Children, Great Ormond Street, W.C.*1.—Res. med. asst. and clin pathologist, £125. Also two H.P.'s and H.S., each at rate of £50.
Hull, Beverley Road Institution.—Asst. M.O., £350.
Hull Royal Infirmary.—Second H.P., at rate of £150.
Leeds Jewish Hosp.—Res. M.O.
London County Council.—Asst. M.O.'s, £470. Asst. M.O. (class I), £350. Also asst. M.O.'s (class II), each £250.
*London Hosp., E.*1.—Clin. asst. in X-ray dept., £100. Also anæsthetist to dental dept., £25.
Maidstone, Kent County Ophthalmic and Aural Hosp.—H.S. to ophthalmic dept. and H.S. to ear, nose, and throat dept., each at rate of £200.
Manchester, Crumpsall Hosp.—Res. asst. M.O., at rate of £200.
Manchester, Park Hosp., Davyhulme.—Asst. res. M.O. to special depts., at rate of £300.
Manchester, Victoria Memorial Jewish Hosp., Cheetham.—Jun. H.S. and cas. O., at rate of £125.
Manchester Royal Infirmary.—H.S. to special depts., at rate of £50. Also hon. radiologist.
*Metropolitan Hosp., Kingsland Road, E.*8.—Cas. O. and res. anæsthetist, £100.
Middlesex County Council.—Various appointments, £1000 per annum to 3 guineas per session.
Milford, Surrey County Sanatorium.—Jun. asst. res. M.O., at rate of £250.
*Miller General Hosp., Greenwich Road, S.E.*10.—Two cas. O.'s, each at rate of £150. Also H.P. and H.S., each at rate of £100.
Ministry of Agriculture and Fisheries: Foot and mouth disease research committee.—Scientific superintendent, £1000.
Newport County Borough.—Asst. M.O.H., £600.
Northampton, St. Andrew's Hosp.—First asst. M.O., £625.
Nottingham, Children's Hosp.—Res. H.S., at rate of £150.
Nottingham General Hosp.—Res. anæsthetist, at rate of £150.
Oxford, Warneford Hosp. for Mental Disorders.—Locum tenens, 7 guineas per week.
Oxford University.—Research student in dept. of clinical medicine, £300.
Plymouth, Prince of Wales's Hosp., Greenbank Road.—H.S., at rate of £120.
Portsmouth Royal Hosp.—Sen. H.S., at rate of £175.
*Princess Beatrice Hosp., Earls Court, S.W.*5.—Res. surg. O., at rate of £200.
*Princess Louise Kensington Hosp. for Children, St. Quintin Avenue, W.*10.—Clin. asst. for outpatient dept. Also hon. asst. physician.
Prison Service (England and Wales).—M.O. (class II.), £525.
*Queen Charlotte's Maternity Hosp., Marylebone Road, N.W.*1.—Obstetric surgeon to inpatients.
*Queen Mary's Hosp. for the East End, Stratford, E.*15.—Outpatient officer, at rate of £150. H.P. and two H.S.'s, each at rate of £120. Also obstet. H.S., at rate of £110–£130.
Reading, Battle Hosp.—Res. asst. M.O., £300.
Reading, Royal Berkshire Hosp.—Hon. obstetrician and gynæcologist. Hon. asst. obstetrician and gynæcologist. Also asst. to pathologist, £350.
Royal Air Force.—Commissions.
*Royal Cancer Hosp., Fulham Road, S.W.*3.—Surg. reg., £150. Also H.S., at rate of £100.
Royal College of Surgeons of England.—Member of the Court of Examiners.
*Royal Free Hosp., Gray's Inn Road, W.C.*1.—Res. cas. O., at rate of £150. Inpatient obstetric assistant. Also third H.P.
Royal Naval Medical Service.—M.O.'s.
Royal Naval Volunteer Supplementary Reserve, Medical Section.—M.O.'s.
Ryde, Royal Isle of Wight County Hosp.—H.P., £130.
*St. Bartholomew's Hosp. Medical College, E.C.*1.—Lecturer in public health. Also lecturer on forensic medicine.
St. Helens County Borough.—Temporary A.M.O., £500.
*St. Mary's Hosp., W.*2.—Hon. medical officer for electro-therapeutic dept.
*St. Paul's Hosp. for Urological and Skin Diseases, Endell Street, W.C.*2.—H.S., at rate of £100.
*Saint Pancras Dispensary, 39, Oakley Square, N.W.*1.—Hon. physician.
*Samaritan Free Hosp. for Women, Marylebone Road, N.W.*1.—Pathologist, at rate of £250.
Sheffield Royal Infirmary.—Two surgical first assts. and clin. asst. to dermatological dept., each £300. Also sen. cas. O., at rate of £150.
Southampton Free Eye Hosp.—H.S., at rate of £150.
Southend-on-Sea General Hosp.—H.P., H.S., and cas. O., each at rate of £100.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Hon. asst. surgeon.
Stourbridge, Corbett Hosp.—H.P. and H.S., at rate of £125 and £100 respectively.
Truro, Royal Cornwall Infirmary.—Jun. H.S., £120.
*University of London, King's College, W.C.*2.—Lecturer in physiology, £350.
Walsall General Hosp.—H.S., at rate of £150.
Wellington Hosp., New Zealand.—Surgical registrar, £500.
Wembley Borough.—Deputy M.O.H., £700.
*West End Hosp. for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.*1.—Hon. asst. surgeon. Hon. psychotherapists. Also hon. clin. assts.
Winchester, Royal Hampshire County Hosp.—H.S., at rate of £100.
Windsor, King Edward VII Hosp.—Cas. O., £120.
*Woolwich and District War Memorial Hosp., Shooters Hill, S.E.*18.—Surg. reg., £100.

The Chief Inspector of Factories announces vacancies for Examining Factory Surgeons at Pontardawe (Glamorgan), Roade (Northampton), and Newtyle (Angus).

Medical Referee under the Workmen's Compensation Act, 1925, for the Newark and Nottingham County Court Districts (Circuit No. 18) and for the Haverfordwest, Pembroke Dock and Narberth County Court Districts (Circuit No. 31). Applications should be addressed to the Private Secretary, Home Office, Whitehall, S.W.1, before May 30 and June 3 respectively.

Births, Marriages and Deaths

BIRTHS

BASSETT.—On May 7, at Cheniston Gardens, W.8, the wife of Dr. J. M. Bassett—a son.

BRIGGS.—On May 6, at Highgate, the wife of Dr. David Briggs—a daughter.

FELLS.—On May 4, at Clifton, Bristol, the wife of Dr. Roy R. Fells—a daughter.

HANCOCK.—On May 7, at Bentinck Street, W.1, the wife of Dr. P. E. Thompson Hancock—a daughter.

NOEL HUMPHREYS.—On May 7, at Portsmouth, the wife of Dr. G. Noel Humphreys—a son.

PHILLIPS.—On May 3, at Welbeck Street, W.1, the wife of Dr. E. S. Phillips, Hemel Hempstead—a daughter.

WILLIAMSON.—On May 6, the wife of Mr. James C. F. Lloyd Williamson, F.R.C.S., of Hove—a daughter.

WILSON.—On May 6, at Summer Court, Cornwall, the wife of Dr. C. M. Wilson—a son.

DEATHS

ANLEY.—On April 23, at Shanklin, Surgeon Captain Frederick Eustace Anley, M.R.C.S., R.N. (retd.).

BAIN.—On May 4, at Catford, Lawrence Weir Bain, M.C., M.B. Aberd., barrister-at-law, aged 48.

EVANS.—On May 7, at Edgbaston, Birmingham, Thomas David Fabian Evans, M.B., C.M. Edin., M.R.C.S., in his 88th year.

GORDON.—On May 2, Sydney George Gordon, L.R.C.P.I., D.P.H., Nottingham.

GORDON-SMITH.—On May 6, at Knightwick, Worcester, Harry Gordon-Smith, M.B. Camb., D.P.H.

GRIFFITHS.—On May 6, Sidney Harold Griffiths, M.D. Durh., M.R.C.S., D.P.H., of Brighton.

HOLDEN.—On May 5, at Reading, George Herbert Rose Holden, M.D. Camb., knight of grace of the Order of St. John of Jerusalem.

KELLY.—On May 7, at Hurstpierpoint, Francis Harry Kelly, M.B. Lond.

KENNEDY.—On May 5, F. W. Kennedy, M.D. Dubl., late of Limerick, in his 75th year.

KETTLE.—On May 4, Marguerite Henrietta Kettle, M.R.C.S.

MCCAUSLAND.—On May 4, at Swanage, Dorset, Albert Stanley McCausland, M.D. Brux., M.R.C.S.

THOMAS.—On May 5, Percy Dewhurst Thomas, L.M.S.S.A.

TWINING.—On May 7, at Manchester, Edward Wing Twining, M.R.C.P., F.F.R., D.M.R.E., aged 52.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

FLORENCE NIGHTINGALE HOSPITAL FOR GENTLEWOMEN.—On April 20 Mr. R. M. Handfield-Jones, secretary to the medical committee, took the chair at the annual general meeting of this hospital, which is maintained for the medical and surgical treatment of the wives, daughters and near relatives of professional men with limited means, who cannot afford a nursing-home and who do not want to go to a general hospital. There are 38 beds and the patients are attended by physicians and surgeons from the staffs of London hospitals. Miss Lilian Faithfull spoke of the work which women had been inspired to do by Florence Nightingale, who herself founded the "Establishment for Gentlewomen during illness," as it was then known. The hospital may be addressed at 19, Lisson Grove, London, N.W.1.

NOTES, COMMENTS, AND ABSTRACTS

HIGH AND LOW ENEMAS

BY O. A. MARXER
RADIOGRAPHER, RUTHIN CASTLE CLINIC, NORTH WALES; AND
S. W. PATTERSON, D.Sc. Lond., M.D. Melb., F.R.C.P.
PHYSICIAN AND BACTERIOLOGIST TO THE CLINIC

"High enema, an injection into the colon."—Gould's Medical Dictionary, 1935.

"High enema, an enema thrown up into the colon."—Stedman's Medical Dictionary, 1936.

THE standard technique of giving a barium enema used by all radiologists, whose object is to obtain quickly and completely a picture of the whole colon in its natural state with the least disturbance of the patient, is to introduce the rubber tube two or three inches into the rectum and to allow the contrast suspension to run in by gravity from a height of not more than two feet. Fluid thus injected into the rectum generally reaches the cæcum in less than ten minutes. If the injection is too rapid or spasm of the bowel occurs, it is sufficient to retard the flow and to get the patient to take a few deep breaths (Marxer 1923). The capacity of the normal colon in the morning is about 30 oz., when the fluid is run in under low pressure. If too large an amount is used, the bowel may be distended and elongated (Spriggs 1931). With the above routine consistent filling of the colon is obtained. Nevertheless the teaching in nursing and medical textbooks on the methods of giving enemas and colonic irrigations is so diverse and discrepant, that a restatement of the facts is advisable.

HISTORY

The position at the end of last century is represented by Burney Yeo's (1895) direction to "administer an enema by a long tube; unless the buttocks are raised or a very long tube is used, it will be found that the enema is often immediately rejected and does not get beyond the rectum." Lauder Brunton (1893) said a flexible soft rubber tube should be passed for eight or ten inches up the intestine. By this method the fluid is introduced into the sigmoid flexure or descending colon; and, if the patient can be propped somewhat so as to lie on his left side, none of it may descend into the rectum, and there will be little or no tendency to evacuate it.

Combe of Lausanne was a leading advocate of the treatment of intestinal auto-intoxication by irrigation of the colon. In his book (1907) he says: "To make a good lavage of the intestine, it is necessary to carry the liquid to the cæcum, but without distending or irritating the intestine. This cannot be done with the ordinary rectal douche with short nozzle and strong pressure. We use English catheters of small calibre (16 to 24 French scale) 50 cm. long for children and one metre or more for adults. By introducing the catheter a few centimetres at a time its whole length can be easily introduced and the water carried to the cæcum without causing the patient the slightest pain or discomfort, the quantity used varying from 500–1500 c.cm." This appears in the English translation of Combe's book (1908) and is repeated word for word in Combe's book on the treatment of mucomembranous colitis (1918). Humphry's "Manual of Nursing" (1907) advocated the same method, "a long rectal tube passed further and further"; though "it is not always easy to introduce and when it seems to be travelling on it really may be coiling upon itself." Combe's teaching has been widely followed.

Hurst (1909), however, stated that his X-ray observations had shown that fluid introduced through an india-rubber tube into the intestine reached the cæcum without difficulty. "It is generally useless to introduce the tube more than three or four inches, as X-ray observations show that when it reaches the pelvirectal flexure its end turns backwards towards the anus, from which it may finally project. Occasionally a hard india-rubber tube may be pushed into the pelvic colon, but it is dangerous to exert much force; if no other means succeed, the tube may be introduced into the pelvic colon through a sigmoidoscope. If between one and a half and three pints of water are introduced into the colon in this way, the whole of it is slightly distended." This Hurst calls a "high" enema, in contradistinction to a "low" enema administered in "the ordinary way with Higginson syringe, by which the rectum and pelvic colon are so quickly stimulated to contract that it is generally difficult to inject more than a pint of fluid and not much of this gets beyond the pelvic colon." In spite of this clear teaching, which Hurst repeated in 1921, with a skiagram which "shows how the tube invariably turns back when it reaches the pelvirectal flexure, the acute angle formed by the junction of the movable pelvic colon with the fixed rectum, and then coils round the rectum," and again in 1935, many writers continue to give misleading directions.

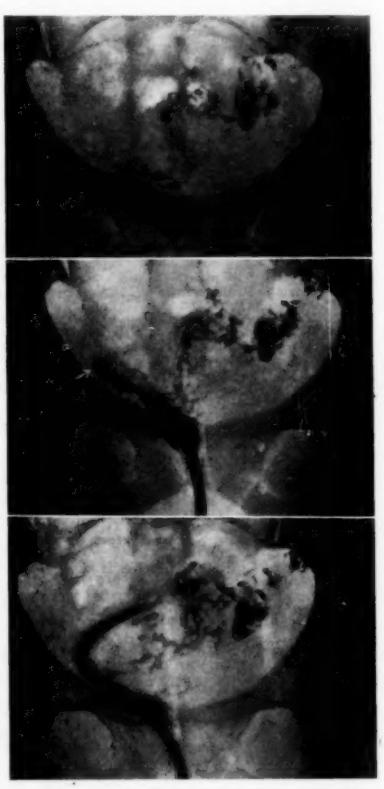

FIG. 1—Radiograms of rectum and sigmoid colon. (A) Strial picture showing sigmoid folded over rectum; (B) rubber tube inserted until resistance is felt at rectosigmoid flexure (arrow); (C) sigmoid unfolded beyond rectosigmoid flexure by the comparative rigidity of the rubber tube.

Herschell and Abrahams (1914) recommend that the end of the tube should pass four inches into the rec-

tum, but they quote in full Combe's directions given above and then state that Kemp, of New York, no longer uses a colon tube but a rectal irrigator, for one can wash the bowel as thoroughly with the five-inch tube by this method as with the colon tube. "The adult rectum averages 8 inches in length and the adult sigmoid 17½ inches. The mesentery of the sigmoid is often very long, allowing that viscus to be readily pushed up. Thus to enter the descending colon where it joins the sigmoid flexure a rectal tube 28 to 30 inches long is necessary." Maxwell and Pope (1914) state that the enema tube should be inserted "eight or nine inches"; Gullan (1920) "ten to twenty inches so that the injection may enter the colon"; Cook (1912) and Harmer (1922) about six inches; Perry and Harvey (1932) six to ten inches; Stewart and Cuff (1911) six to eight inches; Krusen (1936) four to six inches. Hey Groves and Fortescue-Brickdale (1916) say "the tube should be inserted by means of a gloved finger as far as possible up the rectum"; Hassard and Hassard (1927) "the catheter should be inserted gently and pushed on till only two or three inches of it are visible"; and Sanders (1922) says four to eight inches for a low enema, but with a high enema "the object is to reach as far up the colon as possible, more than eight inches. Frequently the tube is found to have coiled, but once past the sigmoid flexure the tube should be pushed forward as long as it meets no resistance." Wiltsie (1931) advocates passing a 52-inch tube through the colon "directly into the cæcum, which is successful in at least 95 per cent. of the cases." On the other hand, Ashdown (1929), Stewart (1931), Russell (1932), Bastedo (1932), Spriggs (1934), Friedenwald and Morrison (1935), Patterson (1937), and a standard French manual for hospital nurses (1914) all state that the tube should be introduced for two to four inches, and that it is useless to insert it further.

PRESENT OBSERVATIONS

A series of twenty patients was observed during the routine of giving a barium enema, and the position of the tube and filling noted in the early stages, when the colon was filled, and after emptying. In these cases attempts were made to pass the tube into the sigmoid flexure.

In the normal empty state the sigmoid colon is huddled up in the pelvis, over the contracted and shrunken rectum. Radiologically, the empty rectum shows (longitudinal) plication which terminates abruptly above at the rectosigmoid junction. Fig. 1 shows (*a*) a strial picture of the rectum and sigmoid, the latter being folded over the rectum; (*b*) the rubber tube inserted until resistance is felt at the rectosigmoid junction; (*c*) the sigmoid unfolded beyond the rectosigmoid flexure by the comparative rigidity of the tube. For these observations the rectal tube has been pushed on gently until resistance was felt. It reached the sigmoid in six of the twenty cases; in the other fourteen the tube curled up in the rectum (fig. 2). The possibility that a dilated rectum may allow the tube to glide into the sigmoid more readily was not borne out; the air-distended rectum shows the tube curled up nevertheless. Fig. 3 demonstrates that, even if the tube is successfully made to enter the sigmoid,

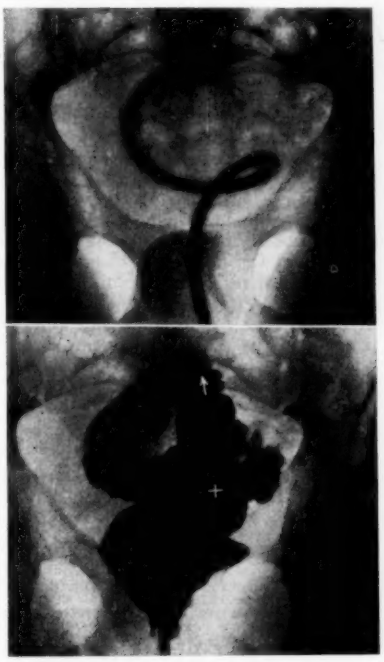

FIG. 3—Radiograms showing that, even with the enema tube in the sigmoid colon, filling takes place from below upwards. (A) Tube in sigmoid colon; (B) the same after injection of opaque enema, arrow showing site of tip of tube in colon, and cross marking recto-sigmoid flexure.

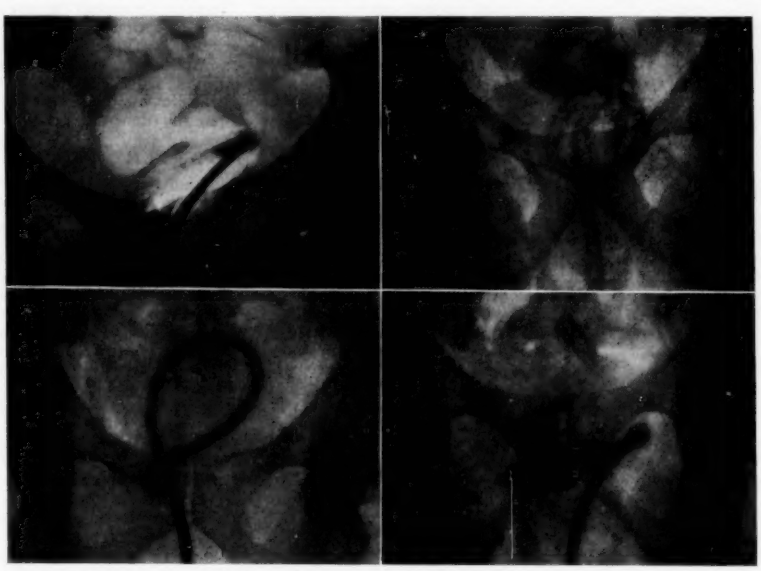

FIG. 2—Radiograms showing rubber tube curled up in rectum after reaching resistance of rectosigmoid flexure.

the filling is still downwards before upwards; the rectum is filled first, and afterwards the fluid finds its way into the descending colon.

CONCLUSIONS

The terms "high" and "low" as applied to enemas have nothing to do with the distance the rectal tube is inserted, but only with whether the fluid is injected gently, so that it may percolate into the upper colon, or violently, so that it is rejected by the rectum and pelvic colon before it can pass further. The terms are confusing, especially to nurses and the laity, and should be abandoned.

The rectal tube should not be inserted more than four inches. If inserted further it either curled up in the rectum, or, in the minority of cases in which it reached the pelvic colon, the rectum was always filled before the fluid passed into the colon.

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NARCOTIC ABUSE IN EGYPT

IN his report for 1938 Russell Pasha[1] (now Sir Thomas Russell), director of the Central Narcotics Intelligence Bureau of Egypt, while recording continued progress in countering illicit traffic in dangerous drugs, expresses apprehension lest any relaxation in the efforts of the last ten years may lead to a drifting back to the previous widespread addiction to narcotics. The report, as usual, is heavily documented and bristles with statistics. Cases of seizures of narcotics on or before arrival from abroad as well as those made in the interior of the country are set out in detail, accompanied by illustrations showing the elaborate, but misapplied, ingenuity by which the contraband drugs are concealed. The capitulations have now been abolished and foreign subjects are now tried in Egyptian courts under the new narcotic law. Of 2592 charged with offences during 1938, 2088 were convicted. The most significant figure in the seizure tables is the large and growing amount of opium that was confiscated—viz., 1037 kg. against 247 kg. in 1935. Opium is largely supplanting heroin and is now the favourite narcotic. Until recently it was taken by chewing, as in India, but the new vogue of administration is by hypodermic injection of a decoction of the drug. The magnitude of this innovation is disclosed by the fact that some 49,500 hypodermic syringes were purchased last year by the non-professional public. Out of a total of some 15,000 addicts 6000–7000 employed hashish, 5000 opium, 2600 heroin and 13 cocaine. Of 1476 traffickers reported to the Narcotics Bureau in 1938 no fewer than 1412 were natives of Egypt, 17 were French, 15 Greek, 15 British, 11 Italian, and 5 Chinese.

Of the contraband opium entering Egypt three-quarters comes from the Suez Canal front, either through the canal ports, thrown over in canal transit, or smuggled from Palestine through Sinai. Russell Pasha again urges the need for more preventive police for Suez, provided with motor launches. Unfortunately the Narcotics Bureau and the Cairo city police have, under the new treaty, lost half of their expert European officers and constables, and in two years' time the anti-narcotic defence of Egypt will be entirely staffed by native police. Unless some of the European head constables are re-engaged the director fears that many of the hundreds of deported foreign traffickers known to the police will re-enter the country unrecognised by the native detectives. The Pasha warns his government of the perils of a policy of stinting in personnel or equipment the efficient force which he has gathered and instructed.

1. Annual Report for 1938 of the Central Narcotics Intelligence Bureau to the Egyptian Government, Cairo. Government Press. Bulâq, 1939.

PAPAVERINE AND THE INTESTINE

MORPHIA is liable to increase rather than decrease the muscular tone of both the large and small intestine, and I. A. Bargen and R. J. Jackman of the Mayo Clinic observe that regions of contracted bowel, obstructive in nature, alternating with stretches of distended bowel are found alike in the toxæmia of peritonitis and after the administration of morphia (*Surg. Gynec. Obstet.* April, 1929, p. 479). Since the drug is commonly used to relieve pain and post-operative discomfort after gastro-intestinal operations they have tried to find a better drug for this purpose. Having investigated certain other alkaloids of opium they conclude that papaverine hydrochloride in dosage of 1–1½ grains has all the analgesic advantages of morphia without its drawbacks. This drug alone or, better, in combination with atropine and Pantopon (papaveretum B.P.C.) was found to be of great value in relieving the abdominal cramps and foul discharges of ulcerative colitis.

TEMPORA MUTANTUR

DR. O. P. CLARK writes: There must be many readers who, like myself, look back nearly a quarter of a century now to the days of our military service, following, in many cases, all too rapidly on an interrupted 'varsity or even school career. As one who in his day rather "went through the mill" I have all the time a sneaking sympathy for the various young recruits in territorial units who come up to see me in course of ordinary panel practice. But perhaps my sympathy is misplaced, for a note brought to me the other day by a young man who came to have his ears syringed read as follows: "Will you please arrange to have your ears syringed by your next drill night (Monday) so that the Medical Officer might re-examine them. Please report to Sgt. —— on your arrival in the Drill Hall." Will you *please* arrange . . . *Please* report. Shades of Salisbury Plain! Wraiths of Wimereux! Ghosts of Gommecourt! O Tempora! O Mores! Nevertheless I am still keeping venesection equipment in readiness in my emergency bag with the special idea of dealing rapidly and efficiently with casualties among sergeant-majors. And who knows whether I shall need it one day?